

Research Note

Recordkeeping Practices of Beef Grinding Activities at Retail Establishments

L. HANNAH GOULD,^{1*} SCOTT SEYS,² KAREN EVERSTINE,³ DAWN NORTON,⁴ DANNY RIPLEY,⁵ DAVID REIMANN,³ MOSHE DREYFUSS,⁶ WU SAN CHEN,⁶ AND CAROL A. SELMAN⁷

¹Enteric Diseases Epidemiology Branch, National Center for Emerging and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention, 1600 Clifton Road N.E., M/S D63, Atlanta, Georgia 30333; ²Foodborne Disease Investigations Branch, U.S. Department of Agriculture, Food Safety and Inspection Service, 1400 Independence Avenue S.W., Washington, DC 20250; ³Minnesota Department of Health, 85 7th Place E., No. 220, St. Paul, Minnesota 55101; ⁴California Emerging Infections Program, 360 22nd Street, Suite 750, Oakland, California 94612; ⁵Nashville–Davidson County Metro Public Health Department, 1 Public Square, No. 106, Nashville, Tennessee 37201; ⁶Microbiological Issues Branch, U.S. Department of Agriculture, Food Safety and Inspection Service, Aerospace Center, Room 344, 1400 Independence Avenue S.W., Washington, DC 20250; and ⁷Environmental Health Services Branch, National Center for Environmental Health, Centers for Disease Control and Prevention, 4770 Buford Highway, Atlanta, Georgia 30341, USA

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ABSTRACT

Ground beef has been implicated as a transmission vehicle in foodborne outbreaks of infection with pathogens such as *Escherichia coli* O157:H7 and *Salmonella*. During outbreak investigations, traceback of contaminated beef to the producing facility is often unsuccessful because of inadequate recordkeeping at retail establishments that grind beef products. We conducted a survey in three states participating in the Environmental Health Specialists Network to describe beef grinding and recordkeeping practices at retail establishments. In each establishment that maintained grinding logs, three randomly selected records were reviewed to determine whether important data elements for traceback investigations were recorded. One hundred twenty-five stores were surveyed, of which 60 (49%) kept grinding logs, including 54 (74%) of 73 chain stores and 6 (12%) of 51 independent stores. One hundred seventy-six grinding records from 61 stores were reviewed. Seventy-three percent of the records included the establishment code of the source beef, 72% included the grind date and time, and 59% included the lot number of the source beef. Seventy-five percent of records noted whether trimmings were included in grinds, and 57% documented cleanup activities. Only 39 (22%) records had all of these variables completed. Of stores that did not keep grinding logs, 40% were unaware of their purpose. To facilitate effective and efficient traceback investigations by regulatory agencies, retail establishments should maintain records more detailed and complete of all grinding activities.

Consumption of beef, particularly ground beef, is a risk factor for infection with several foodborne pathogens, including *Escherichia coli* O157:H7 and *Salmonella* (8, 10). Foodborne disease outbreaks with ground beef as a vehicle of infection are relatively common; in 2006, outbreaks caused by ground beef accounted for approximately 10% of outbreaks with a known food vehicle (3). Contaminated ground beef ground at grocery stores or other retail establishments has been implicated in a number of outbreaks (8). In some of these outbreaks, investigators found that although the retail establishment where the beef was ground or purchased could be identified, determining the source of the implicated beef supplied to the retail establishment was difficult or impossible. To identify the source of the contaminated product (traceback investigation), investigators must be able to determine what products were incorporated into each batch of ground beef, on what day, and whence these products originated. Additionally,

records of beef grinding activities (grinding logs) can help investigators to identify other potentially contaminated batches of meat that might have originated at the same establishment, and other establishments that might have been affected by contaminated product (traceforward investigation). Difficulties in these investigations have been attributed to poor retail recordkeeping practices or to inadequate or incomplete grinding logs.

While establishments are required by both the Federal Meat Inspection Act (21 United States Code [U.S.C.] 642) and the Poultry Products Inspection Act [21 U.S.C. 460(b)] to keep records that will disclose fully and correctly all transactions involved in their business subject to the acts (including keeping bills of sales, invoices, bills of lading, and receiving and shipping papers), there are currently no U.S. Department of Agriculture (USDA) or state requirements to generate or maintain grinding logs. Because many USDA Food Safety and Inspection Service (FSIS) traceback activities have been impeded by lack of information, the FSIS and public health officials continue to encourage businesses to maintain production records such as grinding

* Author for correspondence. Tel: 404-639-3315; Fax: 404-639-2205; E-mail: lgould@cdc.gov.

TABLE 1. Summary of store characteristics and grinding activities in EHS-Net sites, by store type, 2008

Characteristic	Store type:		
	All (n = 125)	Chain (n = 74)	Independent (n = 51)
Median no. (range) of grinds per week	7 (2–140)	10 (3–140)	7 (2–42)
Median no. (range) of kilograms per grind	18 (1–363)	23 (2–182)	14 (1–363)
Stores using trimmings for grinds (%)	78	91	61
Among stores using trimmings in grinds, those grinding separately (%)	78	90	52
Stores maintaining grinding logs (%)	49	74	12

logs that provide important information about how, when, and where product was prepared, shipped, received, stored, and handled.

The Environmental Health Specialists Network (EHS-Net) is a network of environmental health specialists and epidemiologists in nine states (7). The network conducts special studies to evaluate food preparation and handling practices in restaurants and retail establishments. After a multistate outbreak of multidrug-resistant *Salmonella* Newport infections attributed to store-ground beef (2, 6), we initiated a study in EHS-Net sites to evaluate the prevalence of grinding logs in retail establishments. The primary objectives of this study were to describe how often retail establishments keep grinding logs and to determine the completeness of these grinding logs.

MATERIALS AND METHODS

Three EHS-Net sites (California, Minnesota, and Tennessee) participated in this survey. Each site surveyed a convenience sample of retail establishments that ground beef in their respective jurisdictions; the establishments were selected based on the site's schedule for routine facility inspections and a priori knowledge about whether each establishment ground beef in the facility. The survey was administered as part of routine facility inspections. The survey contained questions on the type and size of the store, the number of times beef was ground each week and the number of kilograms contained in each grind, and whether grinding logs were kept in the store. Each store that kept grinding logs was asked the reasons logs were kept (e.g., corporate requirement), for how long logs were kept, and where the logs were kept (e.g., in store, at corporate headquarters). Additionally, we asked if the establishment included trimmings (i.e., beef remnants typically produced during the cuttings of steaks and other cuts that are routinely incorporated into ground beef products) in beef grinds.

In each establishment that kept grinding logs, three records of individual grinds from the previous month were randomly selected and reviewed to determine whether data elements needed for traceback and traceforward investigations were completed. These data elements included the date and time the grind was performed, the type of product produced, the lot and establishment code of the source beef, whether cleanup was performed between grinds, and whether beef trimmings were included in the grind. Descriptive data analysis was performed with SAS, version 9.2, software (SAS Institute Inc., Cary, NC).

RESULTS

Of the 125 stores surveyed, 43 were in California, 33 in Minnesota, and 49 in Tennessee. Seventy-four (59%) stores were classified as chain stores, and 51 (41%) stores were

classified as independent. Among the 70 chain stores for which ownership information was available, 58 were corporately owned or operated, and 12 were franchisee owned. Most of the stores (91 [73%]) were grocery stores, 14 (11%) were ethnic or international stores, 10 (8%) were butchers or meat markets, and 10 (8%) were another type of establishment.

Overall, the surveyed stores ground beef a median of seven times per week and ground a median of 18 kg per grind, but this differed between chain and independent stores (Table 1). Chain stores also ground more beef in each grind. Three-quarters of stores reported that they used beef trimmings in grinds, and this practice was more common in chain stores (91%) than it was in independent stores (61%). Among the 98 stores using trimmings in grinds, chain stores were also more likely than were independent stores to report grinding trimmings in batches separate from other beef grinds (90 versus 52%).

Overall, 61 (49%) stores kept grinding logs, including 55 (74%) chain stores, but only 6 (12%) independent stores. Among the stores that kept grinding logs, a number of reasons were cited for keeping them, including a corporate or franchise requirement (64%), for store records (23%), for state requirements (16%), for USDA requirements (11%), or another reason (21%). Most stores (39%) kept logs for 6 months to 1 year, 36% of stores kept logs for more than 1 year, 21% for 1 to 6 months, and 3% for less than 1 month.

Stores that did not keep logs were asked why not. The most common reason stated was that they did not know what logs were (35%). Other common reasons stated included because they were not required (21%), that they were supposed to keep them but did not (6%), and that they were too busy or it was too much paperwork to keep logs (5%).

We reviewed 179 grinding log records in the 61 stores that kept grinding logs. Overall, 22% of records included information for all of the data elements that are needed for a traceback or traceforward investigation. The remaining records were either only partially completed or the grinding logs did not record all of the necessary data elements; we did not distinguish between the two. Most records (164 [92%]) indicated the type of product (e.g., 90% lean) produced during that grind, whether trimmings were included in the grind (135 [75%]), the grind date and time (131 [73%]), the establishment code of the source beef (129 [72%]), and the production date of the source beef (120 [67%]). About half of records included the lot number of the source beef (106 [59%]) and whether cleanup was

performed after that grind or on that day (104 [58%]). Fewer records (69 [39%]) contained the “use-by” date of the source beef.

DISCUSSION

Accurate recordkeeping by retail establishments that grind beef is essential for complete and effective investigations during foodborne outbreaks associated with ground beef. In a survey of retail establishments in three states, we found that only half of stores kept grinding logs to document their beef grinding activities, and that grinding logs were more common in chain than they were in independent establishments. Among stores that kept logs, only a quarter maintained complete records needed to conduct a traceback investigation.

The FSIS relies heavily on records maintained by retailers to aid in traceback and traceforward investigations of products associated with illness and other food safety incidents, to determine quickly and effectively the source product, and to ensure that appropriate controls are implemented, because contaminated product can be widely distributed among retailers. With effective traceback and traceforward, contaminated products can be removed from the market in a fashion timelier and more complete, helping to prevent further cases of illness. When traceback and traceforward investigations cannot be completed because of incomplete information, illnesses could continue to occur (4), and recurrent outbreaks associated with the same source might occur (1, 4).

Our findings from this survey are consistent with those reported from recent investigations of outbreaks associated with beef products ground at retail establishments. In 2007 and 2008, the FSIS conducted 16 such investigations involving retail operations (9). Nine (56%) establishments kept grinding logs that contained sufficient information for traceback and traceforward activities; five of these nine investigations resulted in recall actions.

Meat grinding is an important source of cross-contamination in retail establishments (5). In the current study, just over half of the stores we surveyed documented cleanup after grinding beef in their grinding logs. We did not document or review the procedures used by each store for cleanup between grinds, and could not assess whether cleaning activities were sufficient to prevent cross contamination; similarly, we did not assess cleanup procedures in stores that did not keep grinding logs. If cleaning is not documented properly, it might be impossible for investigators to determine the source of a contaminated lot of beef.

Most stores that kept grinding logs cited keeping them to meet a corporate–franchise, state, or USDA requirement, although neither the USDA nor any of the states included in this study had regulations that required retail establishments to keep grinding logs. While it is heartening that many corporate chains and franchises do require their stores to keep records of grinding activities, only half of the establishments we surveyed even maintained records, and

in particular, independent stores kept records of grinding activities less frequently. More work is needed to ensure that retail establishments maintain grinding logs that contain sufficient information for traceback and traceforward investigations.

This study had several limitations. First, we surveyed a limited number of stores, and stores were selected based on convenience rather than a sample more systematic or random. We included more than one store from some chains in the analysis, possibly biasing our findings to reflect the practices of selected corporations or company policies. While our findings were similar across all three participating sites, it is possible that the findings are not representative of other states or of other jurisdictions in the states included in this study. Last, although evidence from outbreak investigations supports the utility of grinding logs, the study was not designed to evaluate any establishment’s safety benefits because of keeping grinding logs.

While proper recordkeeping will aid in more efficient and effective traceback and traceforward investigations, and might help to reduce the scope and duration of outbreaks, grinding logs are only one part of a range of activities that are essential to limit foodborne infections. Other interventions are needed to reduce the prevalence of pathogens such as *E. coli* O157 on beef products (5), and consumers should continue to be vigilant about preparation of ground beef products and prevention of cross-contamination in the home.

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