June 2005

Survey of Meat and Poultry Slaughter and Processing Plants

Final Report

Prepared for

Ronald L. Meekhof
U.S. Department of Agriculture
Food Safety and Inspection Service
300 12th Street SW
Washington, DC 20250

Prepared by

Sheryl C. Cates
Catherine L. Viator
Shawn A. Karns
Peter H. Siegel
RTI International
Health, Social, and Economics Research
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*RTI International is a trade name of Research Triangle Institute.

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1 Introduction

FSIS requires up-to-date information on plant practices to conduct timely and reliable regulatory impact analyses. The Recurring Industry Surveys will provide FSIS with timely data on practices used in the meat, poultry, and egg industries to control pathogens and promote food safety. This report describes the survey procedures and results for meat and poultry slaughter and processing plants.

The U.S. Department of Agriculture, Food Safety and Inspection Service (USDA, FSIS) issues regulations that establish standards for a range of activities associated with the production of meat, poultry, and egg products. The regulatory benefit-cost analyses conducted by FSIS to inform the development of these regulations must be based on reliable information. FSIS is required to conduct appropriate and adequate regulatory impact analyses, as mandated by the Regulatory Flexibility Act (RFA); the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA); the Unfunded Mandates Act of 1995; Executive Order 12988, Civil Justice Reform; Departmental Regulation 4300-4, Civil Rights Impact Analysis; the Data Quality Act; and other similar measures.

The cumulative effect of these statutes and guidance has placed even greater demands on the economic and technical information databases available to the Agency. The premium for timely and reliable regulatory impact analyses, and for the data needed to inform these analyses, has increased significantly. To obtain data needed for conducting regulatory impact analyses, FSIS implemented the Recurring Industry Surveys.

In July 2001, FSIS awarded a contract to RTI International (RTI) to design a survey to collect information about practices and technologies used in the meat, poultry, and egg industries to control pathogens and promote food safety and to prepare the Office of Management and Budget (OMB) clearance package. FSIS received OMB approval to conduct the surveys in August 2003. The survey of egg packing and egg products

processing plants was conducted by RTI in 2003 (Cates et al., 2004). The survey of meat and poultry slaughter and processing plants was conducted by RTI in 2004. FSIS plans to conduct the survey of meat and poultry processing-only plants in 2005. FSIS anticipates conducting the surveys on a recurring basis.

This report describes the survey procedures and presents the results of the meat and poultry slaughter and processing survey. We used a multimodal survey approach. We contacted plants by telephone to screen for eligibility and to identify the target respondent for the survey, mailed a self-administered questionnaire to the target respondent, and made a series of telephone calls to nonrespondents to encourage participation.

This report is organized as follows. Section 2 describes the sample design. Section 3 describes the design and administration of the survey. Section 4 describes the nonresponse bias analysis and weighting and data analysis procedures. Sections 5 and 6 present tabulated survey results for meat and poultry plants, respectively. Section 7 concludes the report with lessons learned, including recommendations for revising the questionnaires for future industry surveys.

2 Sample Design

This section describes the sample design for the survey. We present and discuss the sample design separately for federally inspected plants and state-inspected plants because of differences in the sampling procedures.

2.1 FEDERALLY INSPECTED PLANTS

2.1.1 Sampling Frame

The Enhanced Facilities Database (EFD) was used as the starting point for developing the sampling frame for federally inspected and state-inspected plants.

The Enhanced Facilities Database (EFD)[1] (version dated September 2003) was used as the starting point for developing the sampling frame for federally inspected plants. The EFD is a comprehensive Microsoft Access XP database of active meat, poultry, and egg products establishments under the jurisdiction of FSIS. The EFD combines data from several agency databases with supplementary data from *info*USA (www.infousa.com). The EFD contains information on volume, annual revenue, number of employees, inspection activities, and contact information. So that the most current data were used on active establishments and slaughter volumes, we combined data from the EFD with more recent files from the Performance Based Inspection System (PBIS) (June 2004) and the Animal Disposition Reporting System (ADRS) (FY 2003).

Plants meeting the following criteria were included in the sampling frame for federally inspected meat and poultry slaughter and processing plants:

[1] RTI developed and maintains the EFD for FSIS and updates it on a periodic basis when requested by FSIS. The EFD provides data for economic impact analyses, evaluation studies, and survey sampling frames.

- federal or Talmadge-Aiken[2] inspection authority code,
- active code (1 = currently suspended or 2 = currently open), and
- 03J code for slaughter (or had a slaughter volume for an amenable [i.e., inspected]) species.

In consultation with FSIS, we decided to exclude certain types of plants from the sampling frame so that the sampling frame was representative of the vast majority of plants inspected by FSIS. Also, consideration was given to minimizing respondent burden for very small plants.

We excluded the following establishments from the sampling frame:

- Plants that only slaughter "other" meat species (e.g., equine) (N = 4) or "other" poultry species (e.g., duck, geese, rabbits) (N = 16).
- Plants operating for objectives that are not strictly commercial (N = 36).[3]
- Plants located in a U.S. territory (N = 19) (because of the potential for language barriers in completing the survey).

2.1.2 Stratification

We stratified the sample by Hazard Analysis and Critical Control Point (HACCP) size[4] and type of establishment (meat vs. poultry) so that we could provide results by size and type of establishment. Information on HACCP size was obtained from the EFD.

We used the following rules to classify establishments as meat or poultry:

- If a plant had a meat slaughter volume but no poultry slaughter volume, it was classified as meat.
- If a plant had a poultry slaughter volume but no meat slaughter volume, it was classified as poultry.

[2]Talmadge-Aiken plants are federal plants inspected by state inspection staff.

[3]We searched the name of the establishment and excluded establishments that are universities, religious organizations, prisons, Native American organizations, and state and federal government facilities.

[4]Large plants have 500 or more employees, small plants have 10 or more employees but fewer than 500, and very small plants have fewer than 10 employees or less than $2.5 million in annual sales.

- If a plant had a meat slaughter volume and a poultry slaughter volume (N = 34), we used the following rules to classify the plant as meat or poultry:
  - If the poultry slaughter volume was "other," it was classified as meat.
  - If the plant had more meat slaughter volume, it was classified as meat.
  - If the plant had more poultry slaughter volume, it was classified as poultry.
- If a plant had a 03J slaughter procedure but no volume (N = 41), we conducted Internet searches or contacted the plant by telephone to determine whether the plant predominately slaughters meat or poultry species and the type of species slaughtered for meat plants.[5] If we were unable to reach the plant, we classified it as meat or poultry based on the establishment number (M vs. P).

Table 2-1 provides the final universe size (i.e., population) for federally inspected plants by type of plant and HACCP size.

Table 2-1. Universe Size for Federally Inspected Meat and Poultry Slaughter and Processing Plants (Number of Establishments)[a]

	HACCP Size			
Type	**Very Small**	**Small**	**Large**	**Total**
Meat	519	214	66	799
Poultry	44	91	154	289
Total	563	305	220	1,088

[a]Plants with both meat and poultry slaughter volumes were classified as either meat slaughter plants or poultry slaughter plants based on the largest slaughter volume. If the poultry slaughter volume was "other," the plant was classified as meat.

2.1.3 Sample Size and Precision

An indication of the expected precision of sample survey estimates is the width of the 95 percent confidence intervals calculated for statistics of interest. Decisions about desirable sample precision involve a trade-off between the need for accurate data and the costs of obtaining it. Larger sample sizes yield greater precision, but larger sample sizes also increase the cost of data collection.

[5]We did not rely solely on the establishment number (M vs. P) because we have found that this is not always an accurate indicator, especially for very small plants.

In consultation with FSIS, we decided on a precision of +/−5 percent. That is, a confidence interval would be no larger than 10 percent and would be centered around the estimated prevalence. Thus, the sample design specifies a sample size that is expected to yield precision of +/−5 percent or better for estimates of all proportions, assuming we met our target eligibility and response rates.

We adjusted the required sample sizes upward for anticipated eligibility and response rates. The eligibility rate accounts for plants that do not slaughter livestock or poultry or plants that are no longer in business. Because we used the most recent data available for federally inspected plants, we assumed a 95 percent eligibility rate. As specified in the Information Collection Request (ICR) Supporting Statement submitted to the OMB, the target response rate was 75 percent.

Because the sample size would require surveying all or nearly all establishments, we took a census of all federally inspected poultry plants (very small, small, and large), small meat plants, and large meat plants. We selected a sample of federally inspected very small meat plants.

Table 2-2 summarizes the respondent universe, sample size, anticipated number of eligible plants, and sample yield (i.e., anticipated number of respondents) by type and size of establishment. Our sample design was expected to yield 420 completed surveys with federally inspected meat slaughter and processing plants and 206 completed surveys with federally inspected poultry slaughter and processing plants, for a total of 626 completed surveys.

Table 2-2. Sample Design for Federally Inspected Meat and Poultry Slaughter and Processing Plants (Number of Establishments)

	Meat				Poultry			
	Very Small	Small	Large	Total	Very Small	Small	Large	Total
Universe	519	214	66	799	44	91	154	289
Sample size	310	214	66	590	44	91	154	289
Eligibles	295	203	63	561	42	86	146	274
Sample yield	221	152	47	420	31	65	110	206

2.1.4 Systematic Sampling

We used systematic sampling to select the sample for very small meat plants.[6] The purpose of systematic sampling (instead of random sampling) is to ensure that the selected sample adequately represents the entire respondent universe or population. Systematic sampling forces the sample to include plants with varying characteristics, such as location and type of species slaughtered. With simple random sampling, the sample could be biased, because of coincidence, by including too many or too few of particular categories of plants, causing the sample to misrepresent the respondent universe.

To systematically select the sample for very small meat plants, we used information on geographic location and type of species slaughtered. We defined four geographic regions based on the Census regions: Northeast, Midwest, South, and West.

We defined six types of species slaughtered using information from ADRS on slaughter volume:

- Calves—includes bob veal calves, formula-fed veal calves, nonformula-fed veal calves, and heavy calves
- Cattle—includes bulls and stags, steers, cows, and heifers
- Goats
- Lambs—includes mature sheep and lambs and yearlings
- Swine—includes barrows and gilts, boars and stags, and sows
- Unknown—species not specified in ADRS

Plants that slaughter more than one type of species were classified into one category based on the species slaughtered with the largest slaughter volume. For plants without slaughter volume data and the plant slaughters both cattle and swine (N = 20), we categorized the plant as cattle for the systematic sampling.

Prior to selecting the sample, we sorted the file by type of species slaughtered then geographic region. Once sorted, sample points were selected by choosing every 1.674 (519/310) plant in the sorted list until the entire sample was drawn. Table 2-3 shows the number and percentage of plants in the survey universe, and Table 2-4 shows the number and

[6]Systematic sampling was not used for the other strata because we took a census.

Table 2-3. Survey Universe for Federally Inspected Very Small Meat Slaughter and Processing Plants, by Region and Type of Species Slaughtered

Species Slaughtered	Region									
	Northeast		Midwest		South		West		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Calves	3	0.6	1	0.2	2	0.4	1	0.2	7	1.4
Cattle	39	7.5	44	8.5	35	6.7	45	8.7	163	31.4
Goats	7	1.4	2	0.4	18	3.5	1	0.2	28	5.4
Lambs	17	3.3	5	1.0	7	1.4	11	2.1	40	7.7
Swine	83	16.0	85	16.4	84	16.2	27	5.2	279	53.8
Unknown	0	0.0	2	0.4	0	0.0	0	0.0	2	0.4
Total	149	28.7	139	26.8	146	28.1	85	16.4	519	100.0

Table 2-4. Survey Sample for Federally Inspected Very Small Meat Slaughter and Processing Plants, by Region and Type of Species Slaughtered[a]

Species Slaughtered	Region									
	Northeast		Midwest		South		West		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Calves	1	0.3	1	0.3	2	0.7	1	0.3	5	1.6
Cattle	24	7.7	27	8.7	23	7.4	25	8.1	99	31.9
Goats	5	1.6	2	0.7	10	3.2	0	0.0	17	5.5
Lambs	13	4.2	2	0.7	2	0.7	6	1.9	23	7.4
Swine	51	16.5	46	14.8	53	17.1	14	4.5	164	52.9
Unknown	0	0.0	2	0.7	0	0.0	0	0.0	2	0.7
Total	94	30.3	80	25.8	90	29.0	46	14.8	310	100.0

[a]The sample was selected using systematic sampling.

percentage of plants in the sample for federally inspected very small meat slaughter and processing plants.

2.2 STATE-INSPECTED PLANTS

2.2.1 Sampling Frame

The respondent universe for state plants includes plants that are inspected by state Meat & Poultry Inspection (MPI)

programs with the exception of custom-only plants (because they are exempt from continuous inspection). Twenty-eight states operate state MPI programs. All state-inspected plants are very small or small according to HACCP size classifications. The EFD (version dated September 2003) was used as the starting point for developing the sampling frame for state-inspected plants. The Federal, State, and Local Government Relations Staff (FSLGRS), which serves as a liaison between federal and state plants, provided data on state-inspected plants for inclusion in the EFD (for state-inspected plants as of August 2002).[7] The majority of state-inspected plants in the EFD do not have telephone numbers. So that the most recent data available were used to develop the sampling frame and so that we had telephone numbers for contacting the plants, we combined data in the EFD on state-inspected plants with lists of plants that were state inspected as of August 2003. These data were only available in hard-copy form, so we scanned the data (when possible) or keyed the data to develop an electronic dataset. We then merged these data with the EFD to develop the dataset for the sampling frame.

Plants that conduct slaughter activities for meat or poultry species were included in the sampling frame for state-inspected meat and poultry slaughter and processing plants. In consultation with FSIS, we decided to exclude certain types of plants from the sampling frame so that the sampling frame was representative of the vast majority of state-inspected plants. Also, consideration was given to minimizing respondent burden for very small plants. We excluded the following establishments from the sampling frame:[8]

- plants operating for objectives that are not strictly commercial,
- plants that only conduct custom-exempt slaughter, and
- plants used for cold storage or locker only.

[7]Each state MPI program provides an updated list of state establishments to FSIS annually on FSIS Form 5720-7, State Establishment Directory.

[8]We cannot provide the number of plants that were excluded because these plants were not keyed or scanned when developing the sampling frame.

2.2.2 Stratification

We stratified the sample by HACCP size and type of establishment (meat vs. poultry) so that we could provide results by size and type of establishment. Information on HACCP size is available in the EFD for most plants. If a plant did not have information for HACCP size, it was categorized as very small because 98 percent of state-inspected plants (with size information) are very small. We used information in the EFD or information provided by the states to classify establishments as meat or poultry. If the type was unknown (N = 78) or the plant slaughters both meat and poultry species (N = 39), we classified the plant as meat because 97 percent of state-inspected plants (with type information) slaughter meat species. Table 2-5 provides the final universe size (i.e., population) for state-inspected plants by type of plant and HACCP size.

Table 2-5. Universe Size for State-Inspected Meat and Poultry Slaughter and Processing Plants (Number of Establishments)[a]

	HACCP Size		
Type	**Very Small**	**Small**	**Total**
Meat	862	15	877
Poultry	28	1	29
Total	890	16	906

[a]Plants that slaughter meat and poultry were classified as meat plants because 97 percent of state-inspected plants (with type information) slaughter meat species.

2.2.3 Sample Size and Precision

In consultation with FSIS, we decided on a precision of +/−5 percent. We adjusted the required sample sizes upward for anticipated eligibility and response rates. The eligibility rate accounts for plants that do not slaughter livestock or poultry, plants that are custom-exempt, or plants that are no longer in business. Because we anticipated that some plants would not be eligible, we assumed a 75 percent eligibility rate. As specified in the ICR Supporting Statement submitted to OMB, the target response rate was 75 percent.

Because the sample size would require surveying all or nearly all establishments, we took a census of all state-inspected

poultry plants (very small and small) and all small meat plants. We selected a sample of very small meat plants.

Table 2-6 summarizes the respondent universe, sample size, anticipated number of eligible plants, and sample yield (i.e., anticipated number of respondents) by type and size of establishment. Our sample design was expected to yield 275 completed surveys with state-inspected meat slaughter and processing plants and 17 completed surveys with state-inspected poultry slaughter and processing plants, for a total of 292 completed surveys.

Table 2-6. Sample Design for State-Inspected Meat and Poultry Slaughter and Processing Plants (Number of Establishments)

	Meat			Poultry		
	Very Small	Small	Total	Very Small	Small	Total
Universe	862	15	877	28	1	29
Sample size	475	15	490	28	1	29
Eligibles	356	11	367	21	1	22
Sample yield	267	8	275	16	1	17

2.2.4 Systematic Sampling

We used systematic sampling to select the sample for very small meat plants.[9] We used information on geographic location and availability of telephone number to systematically select the sample.[10] We defined four geographic regions based on the Census regions: Northeast, Midwest, South, and West. Prior to selecting the sample, we sorted the file by geographic region and then availability of telephone number. Once sorted, sample points were selected by choosing every 1.815 (862/475) plant in the sorted list until the entire sample was drawn. Table 2-7 shows the number and percentage of plants in the survey universe and sample for state-inspected very small meat slaughter and processing plants.

[9]Systematic sampling was not used for the other strata because we took a census.

[10]Over 100 establishments did not have telephone numbers. Controlling the sampling rate for plants without telephone numbers would help facilitate administration of the survey, which includes contacting establishments by telephone.

Table 2-7. Survey Universe and Survey Sample for State-Inspected Very Small Meat Slaughter and Processing Plants, by Region

	Survey Universe		Survey Sample[a]	
	No.	**%**	**No.**	**%**
Northeast	8	0.9	5	1.0
Midwest	513	59.5	281	59.2
South	265	30.8	139	29.3
West	76	8.8	50	10.5
Total	862	100.0	475	100.0

[a]The sample was selected using systematic sampling.

3 Survey Design and Administration

This section describes the design of the mail survey instruments, discusses the pretest procedures, and provides an overview of the survey administration procedures.

3.1 SURVEY INSTRUMENT DESIGN

The purpose of the FSIS Recurring Industry Surveys is to obtain information on practices and technologies used to control pathogens and promote food safety.

RTI developed the survey instruments for meat and poultry slaughter and processing plants in conjunction with surveys for egg packers, egg products processors, and meat and poultry processing-only plants. The purpose of the FSIS Recurring Industry Surveys is to obtain information on practices and technologies used to control pathogens and promote food safety. FSIS needs this information to guide regulatory policy making and to conduct required regulatory impact analysis. Additionally, the survey findings can be used to establish baseline measures of current practices and technologies for regulated establishments.

We designed the survey instruments in consultation with various stakeholders at FSIS. Working with these stakeholders we identified their data needs, and then using their data needs as a guideline, we developed appropriate survey questions and response items to address each data need or element. We developed separate survey instruments for meat and poultry slaughter and processing establishments. Table 3-1 identifies the types of information collected in the survey. Appendix A provides copies of the final survey instruments.

We designed the survey instruments as a paper-and-pencil self-administered questionnaire. We evaluated other survey modes but determined that a paper-and-pencil questionnaire that is

Table 3-1. Types of Information Collected in the Survey

1. Slaughter and Fabrication (meat plants) or Deboning (poultry plants)
   - Frequency of sanitation practices
   - Current and expected use of pathogen-control technologies and practices
   - Use of third-party audits
   - Slaughter of imported livestock/birds
   - Slaughter volume
   - Plant activities before and after the interim final rule regarding specified risk materials (SRMs) (cattle plants only)
2. Further Processing
   - Frequency of sanitation practices
   - Current and expected use of pathogen-control technologies and practices
   - Use of third-party audits
   - Processing of imported meat/poultry
   - Labeling claims
   - Production volumes by HACCP code
3. Microbiological Testing Practices
   - Methods of microbiological testing
   - Frequency of microbiological sampling by type of pathogen
   - Methods of environmental testing
   - Frequency of environmental sampling by area
4. Employee Training
   - New hire food safety training
   - On-going food safety training
   - HACCP training
5. Plant Characteristics
   - Age of plant
   - Size of plant
   - Number of shifts
   - Number of employees
   - Sales revenue

administered by mail, with initial and follow-up contacts by telephone, afforded the greatest potential for successful data collection with this population. Many smaller establishments do not have up-to-date Internet access readily available, so a Web-based survey was not feasible. Also, from previous experience we have found that it is difficult for establishments to complete surveys over the telephone because of the need to refer to records or consult with other individuals at the establishment; thus, a telephone survey was not appropriate.

3.2 PRETEST PROCEDURES

Our pretest procedures included a review of the survey instruments using RTI's Question Appraisal System (QAS), pretest interviews with plant personnel at meat and poultry slaughter and processing plants, and interviews with industry trade associations. Based on the QAS findings, the findings from the interviews with plant personnel and trade association representatives, and comments from FSIS, we revised the survey instruments. We describe each of the pretest procedures below.

3.2.1 Question Appraisal System

RTI's QAS is a structured, standardized instrument review methodology that evaluates survey questions in relation to the tasks required of the respondents (to understand and respond to the questions) and evaluates the structure and effectiveness of the questionnaire form itself. In part, the QAS is a coding system (that is, an item taxonomy) that describes the cognitive demands of the questionnaire and documents the question features that are likely to lead to response error. These potential errors include errors related to comprehension, task definition, information retrieval, judgment, and response generation. We used RTI's QAS to evaluate each survey instrument with regard to question wording, response wording, and questionnaire format. Following completion of the QAS review, we revised the survey instruments and conducted pretest interviews and interviews with industry trade associations as described below.

3.2.2 Pretest Interviews

We conducted a combination of on-site and telephone interviews with plant personnel to pretest the survey instruments. We initially conducted interviews with four meat plants and three poultry plants. We interviewed plants representing different HACCP sizes and species slaughtered.

The purpose of the pretest interviews was to

- evaluate whether respondents interpreted the questions as intended and understood the question wording and response items,
- determine whether respondents could correctly follow the skip patterns in the questionnaire,

- obtain feedback on the draft FSIS prenotice letter and information brochure, and
- determine the amount of time (i.e., burden) required to complete the survey.

The pretest findings and suggested revisions to the survey instruments are summarized in a separate document (Viator and Kendall, 2002). Based on the pretest findings, we estimated the survey burden to average 30 minutes per response.

In response to the interim final rule regarding removal and disposal of specified risk materials (SRMs) in cattle, we added several questions to the survey instrument for meat slaughter and processing plants. These questions collected information on plant activities prior to the interim final rule and changes made in response to the interim final rule. We conducted telephone interviews with four beef packing plants to pretest the new questions.

3.2.3 Interviews with Trade Associations

We also obtained feedback on the draft survey instruments and survey protocol from industry trade associations. We conducted in-person or telephone interviews with representatives from the following organizations:

- American Association of Meat Processors (AAMP)
- American Meat Institute (AMI),
- National Chicken Council (NCC),
- National Meat Association (NMA),
- National Turkey Federation (NTF), and
- North American Meat Processors (NAMP).

Most of the trade associations we met with were supportive of the survey effort. They recommended revisions to the draft survey instruments, many of which we incorporated in the revised version.

3.3 SURVEY ADMINISTRATION PROCEDURES

We implemented a variety of procedures aimed at maximizing the response rate to the survey. Prior to survey administration, we met with representatives from AAMP, AMI, NCC, and NTF to discuss their interest in promoting the survey to their

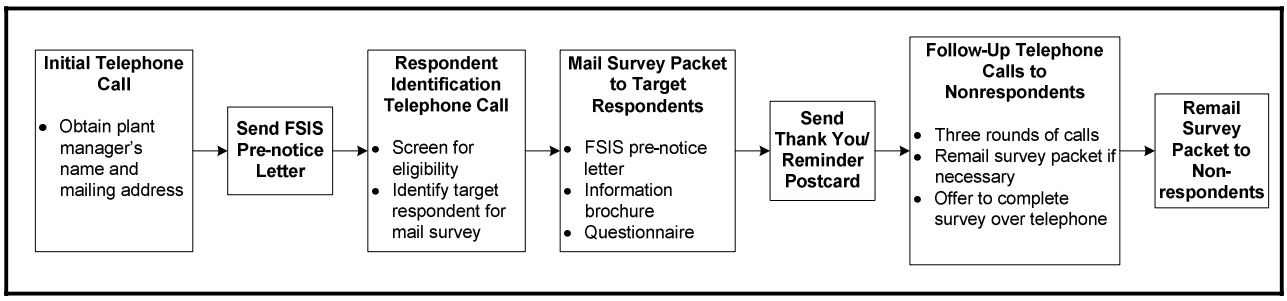
membership and possible mechanisms for promoting the survey. As a result of these meetings,

- AAMP placed information about the survey on their Web site and newsletter;
- AMI, NCC, and NTF sent e-mails to their membership that described the survey and encouraged their participation; and
- RTI participated in a conference call with the NTF Technical and Regulatory Committee to provide an overview of the survey and address any questions or concerns.

Appendix B presents the correspondence that each trade association had with its membership prior to survey administration.

We conducted the full-scale data collection over an approximate 18-week period from September 7, 2004, to January 12, 2005. Figure 3-1 illustrates the steps in the data collection process. We briefly describe each step below.

Figure 3-1. Survey Data Collection Procedures



Contact with inspection personnel. FSIS sent an e-mail to each of the district managers with information on the survey. The district managers were asked to notify Inspectors-in-Charge (IICs) about the upcoming survey so they could verify the legitimacy of the survey to plant management, if necessary. For state-inspected plants, FSIS sent an e-mail to each state inspection office with information on the survey. The state offices were asked to notify their inspectors about the survey.

Initial telephone call. RTI's Call Center Services (CCS) contacted each sampled establishment to obtain the plant manager's name and mailing address.

FSIS prenotice letter. We mailed a letter and information brochure (see Appendix C) to plant managers at sampled establishments. The letter—on FSIS letterhead and signed by the Acting Administrator of FSIS—explained the purpose of the survey, the importance of participation, and RTI's pledge of confidentiality. The letter also promised respondents that they would receive a copy of the survey results. The information brochure—a two-color, trifold brochure—highlighted the purpose of the study and provided contact information for FSIS and RTI.

Respondent identification telephone call. Approximately 10 days after mailing the prenotice letters, RTI's CCS contacted plant managers at sampled establishments. The purpose of this telephone call was to verify eligibility of the plant for participation in the survey (i.e., the plant currently slaughters livestock or poultry, and for state-inspected plants, slaughter activities are not limited to custom slaughter). We also identified the target respondent for the survey (if not the plant manager) and sought to gain their cooperation for the mail survey. Plants that refused to participate were contacted by a member of the project team, and a refusal conversion was attempted.

Survey packet mailing. We mailed the survey packet to the target respondent (as previously identified) via Federal Express. The survey packet included a cover letter on RTI letterhead, another copy of the FSIS prenotice letter and information brochure, the appropriate survey booklet, and a metered (prepaid) envelope for returning the completed questionnaire to RTI. Survey packets sent to poultry plants also included copies of the e-mail messages that NCC and NTF sent to their membership.

Toll-free survey help line. During the data collection period, we operated a toll-free survey help line. Respondents could call the survey help line to request assistance when completing the questionnaire. The survey help line was staffed by members of the project team knowledgeable about the survey and the meat and poultry industry.

Postcard mailing. Approximately 1 week after mailing the survey packets, we sent sampled establishments a personalized postcard (see Appendix D). The postcard served as a thank

you for those who had returned the completed survey and as a reminder for those who had not.

Follow-up telephone calls. Approximately 2 weeks after the postcard mailing, RTI's CCS unit began follow-up telephone calls to nonrespondents to remind then to complete and return the survey. These calls were made at three different points during the data collection period. During the follow-up calls, interviewers offered to send a replacement questionnaire and inquired if the respondent would like to complete the survey over the telephone. Plants that refused to participate in the survey were contacted by a member of the project team, and a refusal conversion was attempted. We successfully converted about 50 percent of the nonrespondents.

Remailing of survey packet. Approximately 7 weeks after the original mailing, we remailed the survey packet (via Federal Express) to all nonrespondents. The cover letter provided a cut-off date for returning the completed survey. We made the final set of follow-up telephone calls approximately 1 week after the remailing.

At each stage of telephone calls (initial, respondent identification, and three follow-ups), at least eight call attempts were made. Sampled establishments without a telephone number or establishments we were unable to contact by telephone were sent the survey materials (FSIS prenotice letter, survey packet, and reminder postcard). Because we were unable to obtain contact information for the plant manager, these items were addressed to "plant manager."

4 Analysis Procedures

This section presents the survey response and eligibility rates, describes the nonresponse bias analysis and weighting procedures, and discusses the data analysis procedures.

4.1 SURVEY RESPONSE AND ELIGIBILITY RATES

We received 598 completed surveys for meat plants (65 percent response rate) and 219 completed surveys for poultry plants (78 percent response rate).

Table 4-1 shows the final disposition of the sample and the eligibility and response rates by stratum. We received 598 completed surveys for meat plants and 219 completed surveys for poultry plants.

We assigned each sample point (establishment) a final disposition of *respondent, nonrespondent*, or *ineligible*. For 88 establishments, the eligibility status could not be determined because a telephone number was not available for the establishment (no listing was available from directory assistance or the telephone number was not in service), or a telephone number was available, but we were unable to verify eligibility in the respondent identification call.

The ineligibles disposition includes establishments that

- do not currently slaughter meat species (cattle, calves, swine, lambs, or goats) or poultry (turkey or chickens);
- perform only custom-slaughter activities;
- previously slaughtered meat species or poultry but are now out of business; and
- are food banks, prisons, university research facilities, or retail operations only.

Table 4-1. Meat and Poultry Slaughter and Processing Survey Eligibility and Response Rates

	Federal								State						Overall		
	Meat				Poultry				Meat			Poultry					
	Very Small	Small	Large	Total	Very Small	Small	Large	Total	Very Small	Small	Total	Very Small	Small	Total	Meat	Poultry	Total
Respondents	185	146	53	384	20	64	128	212	206	8	214	7	0	7	598	219	817
Nonrespondents	83	37	12	132	12	10	23	45	97	6	103	6	0	6	235	51	286
Unknown eligibility	15	9	0	24	4	7	0	11	50	0	50	3	0	3	74	14	88
Ineligibles																	
Do not slaughter	9	14	1	24	6	10	2	18	34	0	34	1	1	2	58	20	78
Custom only	8	0	0	8	0	0	0	0	69	1	70	7	0	7	78	7	85
Out of business	5	6	0	11	2	0	1	3	10	0	10	3	0	3	21	6	27
Other	5	2	0	7	0	0	0	0	9	0	9	1	0	1	16	1	17
Total ineligibles	27	22	1	50	8	10	3	21	122	1	123	12	1	13	173	34	207
Total sample	**310**	**214**	**66**	**590**	**44**	**91**	**154**	**289**	**475**	**15**	**490**	**28**	**1**	**29**	**1,080**	**318**	**1,398**
Eligibility rate (%)[a]	91%	89%	98%	91%	80%	88%	98%	92%	71%	93%	72%	52%	0%	50%	83%	89%	84%
Unweighted response rate (%)[b]	65%	76%	82%	71%	56%	79%	85%	79%	58%	57%	58%	44%	—	44%	66%	77%	69%
Weighted response rate (%)[c]	66%	77%	82%	70%	56%	80%	85%	80%	60%	57%	60%	45%	—	45%	65%	78%	67%

[a]Eligibility rate = (Respondents + Nonrespondents)/(Respondents + Nonrespondents + Ineligibles).

[b]Response rate = Respondents/(Respondents + Nonrespondents + Unknown Eligibility).

[c]Calculated using the survey weights adjusted for unknown eligibility.

Respondents are those establishments that completed and returned the questionnaire.[1] Nonrespondents are those establishments that were eligible for the survey but did not participate. Establishments with unknown eligibility are also considered nonrespondents for the response rate calculation.

The eligibility rate—the proportion of the total sample that was eligible for the survey—is calculated as follows:

$$\text{Eligibility Rate} = \frac{\text{Respondents + Nonrespondents}}{\text{Respondents + Nonrespondents + Ineligibles}} \quad (4.1)$$

The target eligibility rate was 95 percent for federally inspected plants. The actual eligibility rate among federally inspected plants was 91 percent for meat plants and 92 percent for poultry plants.

The target eligibility rate was 75 percent for state-inspected plants. The actual eligibility rate among state-inspected plants was 72 percent for meat plants and 50 percent for poultry plants. The actual eligibility rate was lower than anticipated because of the large number of custom-only plants.

The response rate for the survey—the proportion of eligible establishments that completed the questionnaire—is calculated as follows:

$$\text{Response Rate} = \frac{\text{Respondents}}{\text{Respondents + Nonrespondents + Unknown Eligibility}} \quad (4.2)$$

We computed unweighted and weighted response rates. The weighted response rates were calculated using the survey weights adjusted for unknown eligibility (see Section 4.3). The weighted response rates provide a measure of the percentage of plants on the sampling frame (i.e., the population) that are represented by the responding plants.

With the exception of state-inspected plants and very small federally inspected plants, we achieved the target response rate of 75 percent. The overall weighted response rate for all plants was 67 percent. Response was higher among poultry plants (78 percent) compared to meat plants (65 percent). For both

[1]One meat respondent and one poultry respondent removed the label with their identification number so the stratum was unknown. We used logical imputation to assign these two respondents to a stratum and then randomly assigned an identification number and the corresponding information (e.g., region and species) on the sampling frame.

meat and poultry plants, response rates were higher for federally inspected plants compared to state-inspected plants. For meat plants, the weighted response rate was 70 percent for federally inspected plants and 60 percent for state-inspected plants. For poultry plants, the weighted response rate was 80 percent for federally inspected plants and 45 percent for state-inspected plants. For federally inspected meat and poultry plants, response rates were higher for small and large plants compared to very small plants.

We did not achieve the target number of completed surveys for meat plants (598 vs. 695) because the eligibility rates and response rates were lower than anticipated. We were very close to achieving the target number of completed surveys for poultry plants (219 vs. 223). For large federal meat and poultry plants, we exceeded the target number of completed surveys (53 vs. 47 for meat and 128 vs. 110 for poultry).

4.2 NONRESPONSE BIAS ANALYSIS

Nonresponse may cause bias in survey estimates if plants choosing not to respond would have provided answers to questions that differ systematically from answers provided by plants that choose to respond. Using weighting class adjustments in developing the survey weights (as described in Section 4.3) can help reduce nonresponse bias to the extent that weighting classes are homogeneous (i.e., within a class plants have similar characteristics).

We examined the characteristics of respondents and nonrespondents to determine if there were any statistically significant differences. The characteristics used in the nonresponse bias analysis included region and HACCP size because these characteristics are known for both nonrespondents and respondents. Additionally, for federally inspected plants we included species slaughtered (species is not available for all state-inspected plants). The analysis was conducted using the survey weights adjusted for unknown eligibility (see Section 4.3).

Table 4-2 compares the characteristics of respondents and nonrespondents for all meat plants, federally inspected meat plants, and state-inspected meat plants. Regarding region and species slaughtered (federal plants only), there were no significant differences between respondents and

Table 4-2. Comparison of Respondents and Nonrespondents: Meat Slaughter and Processing Plants

	Respondents		Nonrespondents[a]		t-test p-value
	n	%	n	%	
All Meat Plants					
Region					
Northeast	83	13.9%	37	12.2%	0.4753
Midwest	263	44.6%	134	44.4%	0.8506
South	170	28.2%	98	31.6%	0.2852
West	82	13.3%	40	12.3%	0.6930
Total	598	100%	309	100%	
HACCP Size					
Very small	391	76.8%	245	86.8%	0.0003**
Small	154	17.3%	52	10.7%	0.0077**
Large	53	6.0%	12	2.5%	0.0215**
Total	598	100%	309	100%	
Federally Inspected Meat Plants					
Region					
Northeast	81	23.6%	36	26.0%	0.5515
Midwest	135	32.9%	50	30.3%	0.5565
South	108	27.9%	44	27.8%	0.9955
West	60	15.6%	26	15.8%	0.9527
Total	384	100%	156	100%	
HACCP Size					
Very small	185	60.9%	98	73.9%	0.0037**
Small	146	28.7%	46	20.6%	0.0494**
Large	53	10.4%	12	5.6%	0.0703*
Total	384	100%	156	100%	
Species Slaughtered					
Cattle	117	26.4%	39	21.5%	0.2218
Swine	89	19.6%	29	17.4%	0.5549
Cattle and swine	172	52.5%	85	59.6%	0.1288
Other	6	1.4%	3	1.5%	0.9702
Total	384	100%	156	100%	
State-Inspected Meat Plants					
Region					
Northeast	2	1.0%	1	0.6%	0.7009
Midwest	128	60.2%	84	55.4%	0.3638
South	62	28.6%	54	34.7%	0.2155
West	22	10.2%	14	9.3%	0.7606
Total	214	100%	153	100%	
HACCP Size					
Very small	206	97.9%	147	97.7%	0.8790
Small	8	2.1%	6	2.3%	0.8790
Total	214	100%	153	100%	

**Differences are statistically significant at the 0.05 level.

*Differences are statistically significant at the 0.10 level.

[a]Includes nonrespondents and sample points with unknown eligibility.

nonrespondents. For all meat plants and federally inspected meat plants, there were significant differences with regard to HACCP size. Compared to nonrespondents, a significantly larger percentage of respondents were small or large plants, and a significantly smaller percentage of respondents were very small plants.

Table 4-3 compares the characteristics of respondents and nonrespondents for all poultry plants and federally inspected poultry plants. Because of the small sample size, we did not conduct the analysis for state-inspected poultry plants. Regarding species slaughtered (federal plants only), there were no significant differences between respondents and nonrespondents. Regarding region (federal plants only), a significantly smaller percentage of respondents were from the Northeast census region compared to nonrespondents. For all poultry plants and federally inspected poultry plants there were significant differences with regard to HACCP size. Compared to nonrespondents, a significantly larger percentage of respondents were large plants and a significantly smaller percentage of respondents were very small plants.

As described in the next section, based on the findings from the nonresponse bias analysis we used HACCP size as a weighting class for the nonresponse adjustment.

4.3 WEIGHTING PROCEDURES

We generated all statistical estimates for the survey by applying appropriate survey weights to the respondent record data. We computed survey weights in three steps:

1. We computed initial sampling weights by stratum.[2]
2. We adjusted the initial sampling weights for unknown eligibility.
3. We used weighting class adjustments to adjust the weights for nonresponse to the survey.

We describe each step in our weighting procedures below.

[2]The sample design includes 10 strata for the different combinations of inspection status, type (meat vs. poultry), and HACCP size.

Table 4-3. Comparison of Respondents and Nonrespondents: Poultry Slaughter and Processing Plants

	Respondents		Nonrespondents[a]		t-test p-value
	n	%	n	%	
All Poultry Plants					
Region					
Northeast	22	10.1%	11	16.5%	0.1583
Midwest	48	21.9%	14	21.4%	0.9253
South	129	58.9%	34	52.9%	0.3942
West	20	9.1%	6	9.3%	0.9710
Total	219	100%	65	100%	
HACCP Size					
Very small	128	12.3%	23	38.2%	<.0001**
Small	64	29.2%	17	25.6%	0.5699
Large	27	58.5%	25	36.3%	0.0017**
Total	219	100%	65	100%	
Federally Inspected Poultry Plants					
Region					
Northeast	21	9.9%	11	19.1%	0.0607*
Midwest	42	19.8%	7	12.6%	0.2177
South	129	60.9%	33	59.4%	0.8490
West	20	9.4%	5	8.9%	0.9083
Total	212	100%	56	100%	
HACCP Size					
Very small	20	9.4%	16	28.4%	0.0002**
Small	64	30.2%	17	29.6%	0.9338
Large	128	60.4%	23	42.0%	0.0141**
Total	212	100%	56	100%	
Species Slaughtered					
Chicken	154	72.6%	38	68.0%	0.4931
Turkey	30	14.2%	9	16.0%	0.7265
Chicken and turkey	28	13.2%	9	16.0%	0.5907
Total	212	100%	56	100%	

**Differences are statistically significant at the 0.05 level.

*Differences are statistically significant at the 0.10 level.

[a]Includes nonrespondents and sample points with unknown eligibility.

4.3.1 Initial Sampling Weights

We first assigned each establishment in the sample (i.e., sample point) an initial sampling weight. The initial sampling weight is equal to the inverse of the selection probability where the selection probability is equal to the sample size (n) divided by the population (N). Thus, we calculated the initial sampling weight for each stratum as follows:

$$W_0 = \frac{\text{Population Size(N)}}{\text{Sample Size (n)}} . \quad (4.3)$$

In cases where we took a census, the initial sampling weight is equal to one. For each stratum, the sum of the initial sampling weights across all sampled establishments is equal to the population.

4.3.2 Adjustment for Unknown Eligibility

We calculated adjustment factors within each stratum to adjust for sample points for which the eligibility status was unknown. For establishments with unknown eligibility, the adjustment factor was calculated as follows:

$$F_1 = \frac{\text{Sum of Weights } (W_0) \text{ for Known Eligibles in Stratum}}{\text{Sum of Weights } (W_0) \text{ for Known Eligibles and Ineligibles in Stratum}} \quad (4.4)$$

For establishments with known eligibility, the adjustment factor is equal to one (i.e., $F_1 = 1$).

The adjusted weight for each establishment in a stratum is equal to

$$W_1 = W_0 \bullet F_1 . \quad (4.5)$$

4.3.3 Nonresponse Adjustment

Nonresponse adjustments ensure that, within each weighting class, respondent weights sum to the population counts of eligible establishments. These adjustments, implemented with the computation and application of adjustment factors in each weighting class, can help reduce nonresponse bias to the extent that weighting classes are homogeneous.

Given the sample size, the data available for nonrespondents, and the findings from Tables 4-2 and 4-3 that compared the characteristics of respondents and nonrespondents, we used HACCP size as our weighting class. For meat plants, we used separate weighting classes for federal and state-inspected plants. For poultry plants, we combined federal and state-inspected plants for the weighting class adjustment because of the small sample size.

We calculated adjustment factors (F_2) within each weighting class as follows:

$$F_2 = \frac{\text{Sum of Weights } (W_1) \text{ for Eligibles in Class}}{\text{Sum of Weights } (W_1) \text{ for Respondents in Class}} . \quad (4.6)$$

The adjusted weight for each responding establishment in a weighting class is equal to

$$W_2 = W_1 \bullet F_2. \quad (4.7)$$

The adjusted weight varies by size and inspection status for meat plants and by size for poultry plants. This causes the survey design effect to be 1.106 for meat plants and 1.032 for poultry plants.[3] The design effect is small and should have little effect on the standard errors.

We weighted all results using the final adjusted weights (W_2). For each stratum, the sum of the final adjusted weights across all respondents to the survey is equal to the population of eligible establishments.

4.4 DATA ANALYSIS PROCEDURES

Prior to tabulating the survey data, we conducted data editing and coding and data cleaning. We describe these procedures and our data analysis procedures below.

4.4.1 Data Editing and Coding

RTI's Fulfillment Department Staff edited the questionnaires to resolve any data errors prior to data entry. The most common error made by respondents was not selecting a response option for each question (i.e., item nonresponse). This error was most often made when completing questions in a table format. For example, Questions 1.8, 1.9, 2.13, and 2.14 of the meat survey ask the respondent to indicate whether each technology or process is used now, is expected to be used within 1 to 3 years, or is not expected to be used within 1 to 3 years. In some cases, respondents did not provide an answer for each technology/process; that is, they only provided a response for technologies/processes that are currently used and left the other technologies/processes blank. Respondents made a similar error when providing information on the frequency of microbiological testing by type of organism (Section 3 of the survey); that is, they only provided a response for organisms

[3]The survey design effect is the sample variance for the study divided by the variance of a simple random sample (with no stratification).

tested, although "never" is a response option. Item nonresponse was recorded as a missing value in the dataset.

Another error made by some respondents was selecting multiple responses for questions where only one response was allowed. Some respondents made this error for questions that ask about the frequency of a particular activity (e.g., Question 1.6 for meat plants). For these questions, we resolved the error by changing the response to "no specific routine frequency" because multiple responses (e.g., "once per hour" and "more than once per hour" were selected). If we were unable to resolve the multiple responses (e.g., the respondent circled "yes" and "no"), then the response was coded as "multiple response."

Some respondents wrote "not applicable," "NA," or "doesn't apply" by some questions. We added response options so that we could distinguish between "not applicable" responses and missing values (i.e., "no response") when analyzing the survey data. When appropriate, we excluded the "not applicable" responses from the tabulations; otherwise, we combined the "not applicable," "no response," and "multiple response" options when reporting the results.

Several questions required the respondent to enter a text response (e.g., Question 1.11 for meat plants). For questions with open-ended text responses, we manually coded the open-ended text responses and created new response options as appropriate.

The edited and coded questionnaires were keyed into a database using a data entry system developed by RTI. All data were double-keyed (i.e., 100 percent verification) for quality control purposes. Separate datasets were prepared for meat plants and poultry plants.

4.4.2 Data Cleaning

Prior to tabulating survey responses, we systematically examined the survey datasets to isolate and address data inconsistencies, reporting errors, or otherwise erroneous data. Specific data-cleaning procedures are described below.

Question 5.3 for meat and poultry plants required respondents to enter numeric responses that sum to 100 percent. Some respondents entered values that did not sum to 100 percent.

Respondents' answers were excluded from the analysis if the sum of their responses was less than 80 percent or greater than 120 percent (exclusions are noted in the results tables). If the sum of the responses was between 80 and 120 percent, then we normalized the responses to 100 percent using the initial response distribution and included the responses in the analysis.

Some respondents were inconsistent in their responses regarding the production of ready-to-eat (RTE) and not-ready-to-eat (NRTE) food products. For example, in Section 2 (further processing operations) some respondents initially indicated that they produce RTE or NRTE products, but later in Section 2 or in Section 3 (microbiological testing practices) they indicated that they do not produce RTE or NRTE products, or vice versa. To address this inconsistency, we used Question 2.2 as a filter or screening question for questions in Section 2 that ask about practices for RTE and NRTE products. For Section 3, we used the questions that ask about the use of microbiological testing for RTE and NRTE products (Questions 3.7 and 3.9 for meat plants and Questions 3.6 and 3.8 for poultry plants) as a filter or screening question for questions that ask about testing practices for RTE and NRTE products. We also reviewed other inconsistencies on a case-by-case basis and made additional adjustments to the survey responses as appropriate.

4.4.3 Data Analysis

Sections 5 and 6 of this report provide tables with survey results for meat slaughter and processing plants (n = 598) and poultry slaughter and processing plants (n = 219), respectively. We provide results for all survey questions. Additionally, we provide results by HACCP size for selected questions.

All analyses were conducted using SAS®, a statistical analysis software tool (SAS, 1999), using the final survey weights. We computed proportions for questions in which respondents could select one or more responses from a list of responses. Respondents who did not answer the question were included in the calculation of proportions. The number and percentage of nonrespondents are provided in the results tables. We computed means for questions that required a numeric response from respondents.

For the selected cross-tabulations, we provide the 95 percent confidence intervals (CIs). An indication of the precision of survey estimates is the widths of the 95 percent CIs. For example, if we report that the 95 percent CI for the percentage of small meat plants that use a particular technology is (50 percent, 60 percent), this means that the probability that the true population value lies between 50 percent and 60 percent is 0.95. This means there remains a probability of 0.05 that the true population value lies outside the (50 percent, 60 percent) CI. The CIs were computed using Stata®, a statistical analysis software tool that takes the sample design into consideration when computing the variances, (StataCorp, 2005). The CIs are constructed using a logit transformation so that their endpoints lie between 0 and 1.

We do not report results if the number of responses was small to preserve confidentiality of responses and to avoid the possibility of revealing the identity of plants selected for the sample. Suppressions of results are noted in the results tables with an asterisk (*).

5 Survey Results: Meat Slaughter and Processing Plants

Tables 5-1 through 5-5 provide weighted tabulations for meat slaughter and processing plants (n = 598). The survey results are representative of the population of meat slaughter and processing plants as defined in Section 2. Some regulated establishments were excluded from the sampling frame (e.g., plants that slaughter only equine or plants that are university facilities) so that the sampling frame was representative of the vast majority of FSIS and state-inspected plants.

We computed proportions for questions in which respondents could select one or more responses from a list of responses. The number of respondents (n) for each response is provided in the tables. We computed means for questions that required a numeric response from respondents. The number of respondents (n) used in mean calculations is provided in the tables.

Tables 5-6 through 5-12 provide weighted cross-tabulations for selected questions by HACCP size. In addition to the estimated proportions, we provide the 95 percent CIs for the point estimates.

A summary of the survey findings, based on the overall results presented in Tables 5-1 through 5-5, is provided below:

Slaughter and Fabrication

- The majority of meat plants (74 percent) do not have their slaughter and fabrication operations audited by independent, third-party auditors.

- More than 65 percent of meat plants sanitize hands or gloves that contact raw meat in the slaughter and fabrication areas of the plant once per shift or more often.
- With the exception of organic acid rinses, the majority of meat plants have not adopted the pathogen-control technologies for slaughter and fabrication asked about in Question 1.8 in Table 5-1.
- Almost all (96 percent) meat plants use sterilizer pots for heat sterilization of hand tools during operations.
- The majority of meat plants have written policies and procedures for humane handling of animals (78 percent), controlling the use of hazardous chemicals (75 percent), and recalling product (74 percent).
- Thirty percent of meat plants have written polices and procedures to protect against bioterrorism; more than 50 percent of plants can identify and track their products one step backward and forward.
- Six percent of meat plants import live animals from other countries for slaughter.
- For meat plants that slaughter cattle, nearly 80 percent use dentition to determine the age of cattle. For plants using dentition, 80 percent treat 5 percent or fewer of the fed steers and heifers slaughtered as 30 months of age and older.
- Since the interim final rule on the prohibition of the use of SRMs, 84 percent of cattle plants have added one or more additional procedures to ensure control in the removal of SRMs.
- Sixty-five percent of cattle plants accept approximately the same number of cattle 30 months of age and older since the interim final rule, and 24 percent accept fewer cattle 30 months of age and older.

Further Processing

- More than 80 percent of meat plants also perform processing activities.
- For meat plants with further processing operations, 47 percent produce RTE products, 80 percent produce NRTE products, and 18 percent produce inputs to further processing by another plant.
- The majority of meat plants (72 percent) do not have their further processing operations audited by independent, third-party auditors.

- Nearly 70 percent of meat plants sanitize hands or gloves that contact raw meat in the further processing area of the plant once per shift or more often; 81 percent follow this procedure for RTE products.
- Many meat plants have adopted the pathogen-control processes for further processing asked about in Question 2.13 in Table 5-2. Over 80 percent require and document that raw meat suppliers use stipulated practices for pathogen control, and 54 percent follow this procedure for controlling chemical residues. Nearly 80 percent of plants treat their drains with sanitizers for pathogen control, and 64 percent use chemical sanitizers for hand tools during operations.
- The majority of meat plants have not adopted the pathogen-control technologies for further processing asked about in Question 2.14 in Table 5-2.
- Twenty-three percent of meat plants import raw meat from other countries for further processing.

Microbiological Testing Practices

- Seventy percent of meat plants conduct microbiological testing using either their own lab or an independent commercial lab (in addition to the *E. coli* testing of carcasses required by FSIS regulations).
- Eighteen percent of meat plants test hides prior to slaughter; the majority (77 percent) use traditional cultural methods.
- Seventy percent of meat plants test carcasses prior to fabrication. The majority (66 percent) use traditional cultural methods and test for generic *E. coli* (in addition to mandatory testing) (74 percent) and *E. coli* O157:H7 (72 percent); 45 percent test for *Salmonella* species.
- More than 50 percent of meat plants test raw meat after fabrication. The majority (60 percent) use traditional cultural methods and test for generic *E. coli* (62 percent) and *E. coli* O157:H7 (66 percent); about half test for *Salmonella* species.
- For meat plants that produce RTE finished product, 67 percent test their product. The majority use traditional cultural methods (72 percent) and test for *Listeria* species (71 percent) and *Listeria monocytogenes* (65 percent); 46 percent test for *Salmonella* species.
- For meat plants that produce NRTE finished product, 51 percent test their product. The majority use traditional cultural methods (65 percent) and test for generic *E. coli*

(76 percent), *E. coli* O157:H7 (69 percent), and *Salmonella* species (64 percent).

- More than 50 percent of meat plants conduct environmental sampling; the majority use traditional cultural methods (66 percent) and sample equipment surfaces.
- For meat plants conducting environmental sampling, 76 percent test for *Listeria* species on a routine basis.

Employee Training

- More than 70 percent of meat plants use informal, on-the-job training to teach new hires and current employees about food safety.
- The majority of meat plants (87 percent) have employees that have attended formal HACCP training.

Plant Characteristics

- Less than 5 percent of meat plants operate more than one production shift per day for slaughter and processing.
- The majority of meat plants operate one clean-up shift (75 percent).
- Nearly half of meat plants report that they have a food safety manager on staff.
- Twenty-seven percent of meat plants have a quality control/quality assurance (QC/QA) department.
- Seventy-five percent of plants have annual sales revenue less than $2.5 million, and about 88 percent are part of a company that owns only one USDA- or state-inspected plant.

Table 5-1. Weighted Responses for Section 1 of the Meat Slaughter and Processing Survey: Slaughter and Fabrication

		n	%
1.1[a]	How does this plant dehair carcasses?		
	1. This plant does not dehair carcasses	368	61.4
	2. Scald and rinse	200	33.4
	3. Rosin dip	3	0.3
	No response	30	5.2
1.2[a]	How does this plant dehide carcasses?		
	1. This plant does not dehide carcasses	50	5.6
	2. Skinning knife	473	84.4
	3. Air knife	123	15.4
	4. Mechanical side puller	51	5.1
	5. Mechanical down puller	102	13.9
	6. Mechanical up puller	88	11.1
	No response	13	2.0
1.3[a]	Who conducts independent, third-party audits of this plant's slaughter and fabrication operations?		
	1. This plant's slaughter and fabrication operations are not audited by independent, third-party auditors	391	73.5
	2. Independent, third-party auditors that are hired by this plant or by corporate headquarters	103	10.6
	3. Customers of this plant	122	15.1
	4. Independent, third-party auditors that are hired by customers of this plant	97	10.0
	No response	25	4.2
1.4	To the best of your knowledge, what percentage of live animals slaughtered at this plant during the past year was imported?		
	1. None	523	91.9
	2. 1 to 9 percent	30	2.9
	3. 10 to 24 percent	13	1.2
	4. 25 to 49 percent	7	0.7
	5. 50 percent or more	11	1.5
	No response	14	1.7
	Total	598	100.0

(continued)

[a]Respondents could select multiple responses.

Table 5-1. Weighted Responses for Section 1 of the Meat Slaughter and Processing Survey: Slaughter and Fabrications (continued)

		n	%
1.5[a]	What was the total amount of raw product, not ground, primal cuts (HACCP Code 03C; e.g., whole cuts and steaks, trimmings, mechanically tenderized cuts) produced by this plant during the past year?		
	Pounds of annual production (mean response = 35,724,279)	376	—
	1. None	91	15.4
	2. 1 to 99,999 pounds	122	24.1
	3. 100,000 to 999,999 pounds	121	23.1
	4. 1,000,000 to 9,999,999 pounds	45	5.8
	5. 10,000,000 to 99,999,999 pounds	34	3.4
	6. 100,000,000 to 999,999,999 pounds	51	4.8
	7. 1,000,000,000 pounds or more	3	0.3
	No response/NA *(write in)*	131	23.2
	Total	598	100.0
		n	**%**
1.6	What is the routine frequency used by this plant for sanitizing hands or gloves that contact raw product in the slaughter area of the plant?		
	1. Always before handling the next unit of product	260	44.6
	2. More than once per hour	109	17.7
	3. Once per hour	9	1.3
	4. One or more times per shift, but less than once per hour	43	5.0
	5. No specific routine frequency	157	28.1
	No response/NA *(write in)*	20	3.3
	Total	598	100.0
1.7[b]	What is the routine frequency used by this plant for sanitizing hands or gloves that contact raw product in the fabrication area of the plant?		
	1. Always before handling the next unit of product	146	28.8
	2. More than once per hour	118	20.3
	3. Once per hour	16	2.9
	4. One or more times per shift, but less than once per hour	107	13.0
	5. No specific routine frequency	180	31.4
	No response	22	3.7
	Total	589	100.0

(continued)

[a]Respondents wrote in a number to answer this question. The mean is for nonzero responses. For reporting purposes, we grouped the responses into the categories shown.

[b]Excludes respondents who wrote in "not applicable"; these respondents may not have fabrication areas.

Table 5-1. Weighted Responses for Section 1 of the Meat Slaughter and Processing Survey: Slaughter and Fabrication (continued)

		n	Use the technology now	Expect to begin using the technology within 1 to 3 years	Does not use and does not expect to use the technology within 1 to 3 years	No response/ multiple responses/ not applicable *(write in)*	Total
			%	%	%	%	%
1.8	For each technology listed below, please circle the response that applies for this plant's slaughter and fabrication operations.						
	a. Company-owned lab for microbiological testing	598	16.7	3.6	74.7	5.1	100.0
	b. Bioluminescent testing system	598	8.1	4.6	81.8	5.5	100.0
	c. Conveyor belts made from materials designed to prevent bacterial growth	598	9.1	5.6	80.0	5.3	100.0
	d. Steam pasteurization systems (for example, the Frigoscandia)	598	6.6	1.7	86.6	5.1	100.0
	e. Steam vacuum units	598	10.6	2.8	81.4	5.2	100.0
	f. Organic acid rinse	598	52.7	7.5	35.1	4.7	100.0
	g. Positive air pressure from clean side to dirty side	598	13.5	4.7	75.5	6.3	100.0
	h. Metal detection equipment	598	12.0	4.5	78.0	5.5	100.0
	i. Tempered carcass rinse/wash	598	45.5	6.4	41.1	7.0	100.0
	j. Hock suckers	598	2.7	1.7	89.7	5.9	100.0
	k. Equipment for removal of spinal cord prior to carcass splitting	598	14.5	5.8	75.1	4.6	100.0

(continued)

Table 5-1. Weighted Responses for Section 1 of the Meat Slaughter and Processing Survey: Slaughter and Fabrication (continued)

		n	Use the practice now	Expect to begin using the practice within 1 to 3 years	Does not use and does not expect to use the practice within 1 to 3 years	No response/ multiple responses/ not applicable *(write in)*	Total
			%	%	%	%	%
1.9	For each practice listed below, please circle the response that applies for this plant's slaughter and fabrication operations.						
	a. Requires and documents that its animal growers use stipulated production practices to control pathogens	598	10.3	10.0	74.4	5.3	100.0
	b. Requires and documents that its animal growers use stipulated production practices to control chemical residues (e.g., drugs and growth hormones)	598	27.2	8.3	59.1	5.5	100.0
	c. Rotates sanitizing chemicals it uses in the slaughter area on an annual basis or more frequently	598	52.8	8.7	35.1	3.5	100.0
	d. Uses chemical sanitizers for food contact hand tools used in the slaughter area *during operations*	598	51.4	9.1	36.4	3.1	100.0
	e. Uses sterilizer pots for heat sterilization of hand tools used in the slaughter area *during operations*	598	95.7	0.8	2.1	1.3	100.0
	f. Has written policies and procedures for recalling product	598	73.9	10.1	12.6	3.3	100.0
	g. Has written policies and procedures to protect against bioterrorism	598	29.8	18.9	46.8	4.5	100.0
	h. Has written policies and procedures to control the use of hazardous chemicals	598	74.5	8.6	13.8	3.0	100.0

(continued)

Table 5-1. Weighted Responses for Section 1 of the Meat Slaughter and Processing Survey: Slaughter and Fabrication (continued)

		n	Use the practice now	Expect to begin using the practice within 1 to 3 years	Does not use and does not expect to use the practice within 1 to 3 years	No response/ multiple responses/ not applicable *(write in)*	Total
			%	%	%	%	%
i.	Has written policies and procedures that stipulate humane handling of animals	598	77.5	6.4	13.0	3.1	100.0
j.	Identifies and tracks its products, by production lot, backward to specific animal growers	598	52.5	11.6	32.4	3.5	100.0
k.	Identifies and tracks its products, by production lot, forward to specific buyers (not consumers) of its products	598	53.5	11.6	31.3	3.6	100.0

(continued)

Table 5-1. Weighted Responses for Section 1 of the Meat Slaughter and Processing Survey: Slaughter and Fabrication (continued)

		n	%
1.10[a]	Which of the following best describes this plant's slaughter operations for cattle?		
	1. This plant did not slaughter cattle during 2003 or 2004	98	11.4
	2. This plant slaughtered cattle during 2003 and 2004	474	84.6
	3. This plant slaughtered cattle during 2003 but stopped the slaughter of cattle during 2004	7	1.2
	4. This plant slaughtered cattle during 2004, but not 2003	2	0.4
	No response	17	2.4
	Total	598	100.0
1.11[b]	What method is most frequently used by this plant to determine the age of cattle at this establishment?		
	1. No method is used; all cattle are treated as 30 months of age and older	43	6.9
	2. Dentition	343	74.3
	3. Documentation	46	10.4
	4. Dentition and documentation *(write in)*	22	4.3
	5. Other	13	2.6
	No response/multiple response	6	1.5
	Total	473	100.0
1.12[c]	For fed steers and heifers slaughtered by this plant, what proportion are on average treated as 30 months of age and older based on dentition?		
	1. Less than 1 percent	152	40.3
	2. 1 to 2 percent	103	25.4
	3. 3 to 5 percent	59	14.3
	4. 6 to 10 percent	34	8.5
	5. 11 to 20 percent	12	2.6
	6. More than 20 percent	30	7.4
	No response/multiple response	6	1.4
	Total	396	100.0

(continued)

[a]Respondents who did not slaughter cattle during 2003 or 2004 (n = 98) skipped to Question 2.1 and are not included in the results for Questions 1.11 through 1.18. Respondents who did not slaughter cattle during 2004 are not included in the results for Questions 1.11 through 1.14. Respondents who did not slaughter cattle during 2003 are not included in the results for Questions 1.16 through 1.18.

[b]Excludes respondents who do not currently slaughter cattle.

[c]Excludes respondents who do not currently slaughter fed steers and heifers and do not use dentition to determine age of cattle.

Table 5-1. Weighted Responses for Section 1 of the Meat Slaughter and Processing Survey: Slaughter and Fabrication (continued)

		n	%
1.13[a]	For cattle 30 months of age and older slaughtered by this plant, at what point is the body of the vertebral column removed for most of the cattle slaughtered?		
	1. During the slaughter process at this plant	143	34.8
	2. During the fabrication process at this plant	277	62.1
	3. At another plant owned by the same company that owns this plant	6	1.0
	4. At a plant not owned by the same company that owns this plant	10	1.7
	No response/multiple response	2	0.4
	Total	438	100.0
1.14[b]	How many additional procedures have been developed and implemented by this plant to ensure control in the removal of specified risk materials as a result of the interim final rule on the prohibition of the use of specified risk materials?		
	1. None	68	15.4
	2. 1 to 2	204	46.3
	3. 3 to 4	131	26.5
	4. 5 to 6	31	5.4
	5. More than 6	40	5.9
	No response	2	0.5
	Total	476	100.0
1.15[c]	Is this plant still accepting cattle 30 months of age and older since the interim final rule on the prohibition of the use of specified risk materials?		
	1. This plant did not accept cattle 30 months of age and older prior to the interim final rule	26	4.7
	2. Yes, this plant accepts approximately the same number of cattle 30 months of age and older	316	65.0
	3. Yes, but this plant accepts fewer cattle 30 months of age and older	113	24.3
	4. Yes, but this plant accepts more cattle 30 months of age and older	2	0.3
	5. No, this plant no longer accepts cattle 30 months of age and older	20	4.5
	No response/multiple response	6	1.3
	Total	483	100.0

(continued)

[a]Excludes respondents who do not currently slaughter cattle 30 months of age and older.

[b]Excludes respondents who do not currently slaughter cattle.

[c]Excludes respondents who did not slaughter cattle during 2003 or 2004.

Table 5-1. Weighted Responses for Section 1 of the Meat Slaughter and Processing Survey: Slaughter and Fabrication (continued)

		n	%
1.16[a]	During 2003, did this plant sell small intestines for human consumption?		
	1. Yes	61	9.4
	2. No	416	89.9
	No response/multiple response	4	0.7
	Total	481	100.0
1.17[b]	During 2003, which of the following materials were used in products for human consumption from cattle 30 months of age and older slaughtered by this plant?		
	1. Market heads (with or without eyes)	130	27.9
	2. Brains (sold separately)	34	6.7
	3. Eyes (sold separately)	8	1.4
	4. Spinal cords	8	1.3
	5. Vertebral columns, not including those within a whole carcass	63	11.9
	6. Small intestines	47	6.8
	7. None of these materials	259	61.4
	No response	6	1.3
1.18[c]	During 2003, which of the following bone-in cuts were fabricated at this plant from cattle 30 months of age and older?		
	1. T-bone steaks	252	60.4
	2. Porterhouse steaks	236	57.1
	3. Bone-in or standing rib roasts	227	52.5
	4. Blade or chuck roasts	241	56.5
	5. Short loins	230	49.4
	6. Other bone-in cuts	41	8.5
	7. None of these cuts	132	30.8
	No response	6	1.3

[a]Excludes respondents who did not slaughter cattle during 2003.

[b]Excludes respondents who did not slaughter cattle 30 months of age and older during 2003. Respondents could select multiple responses.

[c]Excludes respondents who did not slaughter or fabricate cattle 30 months of age and older during 2003. Respondents could select multiple responses.

Table 5-2. Weighted Responses for Section 2 of the Meat Slaughter and Processing Survey: Further Processing

		n	%
2.1[a]	Does this plant grind meat or further process meat products?		
	1. Yes	469	81.5
	2. No	129	18.5
	Total	598	100.0
2.2A[b]	What types of further processed food products does this plant produce?		
	1. Ready-to-eat (RTE) products for consumers	210	46.6
	2. Not-ready-to-eat (NRTE) products for consumers	378	79.9
	3. Products that are inputs to further processing by another plant	113	17.9
	No response	25	5.8
2.2B[c]	What types of further processed food products does this plant produce?		
	1. Only RTE products	42	10.4
	2. Only NRTE products	170	38.3
	3. Only products that are inputs to further processing	19	2.7
	4. RTE and NRTE products	119	27.5
	5. RTE products and inputs to further processing	5	1.2
	6. NRTE products and inputs to further processing	45	6.6
	7. RTE products, NRTE products, and inputs to further processing	44	7.5
	8. No response	25	5.8
	Total	469	100.0

(continued)

[a]Respondents who do not grind meat or further process meat products (n = 129) skipped to Question 3.1 and are not included in the results for Questions 2.2 through 2.14.

[b]Respondents could select multiple responses.

[c]Results are shown so that the responses sum to 100 percent.

Table 5-2. Weighted Responses for Section 2 of the Meat Slaughter and Processing Survey: Further Processing (continued)

		n	%
2.3[a]	Thinking only about NRTE products for consumers that include cooking instructions on the label, for approximately how many of such products has the plant validated the cooking instructions?		
	1. This plant's NRTE products do not have cooking instructions	133	37.6
	2. None	89	24.5
	3. Less than half	24	6.3
	4. Half	7	2.0
	5. More than half	13	3.1
	6. All	105	24.8
	No response	7	1.8
	Total	378	100.0
2.4	For domestic products produced by this plant, approximately how many have a special statement or claim on the label to identify the origin of the animal from which the product was made?		
	1. None	386	82.7
	2. Less than half	34	6.1
	3. Half	6	1.5
	4. More than half	5	1.0
	5. All	26	6.1
	No response	12	2.6
	Total	469	100.0
2.5	For domestic products produced by this plant, approximately how many have a special statement or claim on the label to identify where (i.e., geographic location) the product was manufactured?		
	1. None	290	63.2
	2. Less than half	34	6.3
	3. Half	8	1.6
	4. More than half	17	3.6
	5. All	108	22.7
	No response	12	2.6
	Total	469	100.0

(continued)

[a]Excludes respondents who do not produce NRTE products.

Table 5-2. Weighted Responses for Section 2 of the Meat Slaughter and Processing Survey: Further Processing (continued)

		n	%
2.6	What percentage of raw meat processed at this plant during the past year was received or purchased from another plant?		
	1. None	90	19.0
	2. 1 to 9 percent	151	30.3
	3. 10 to 24 percent	86	18.9
	4. 25 to 49 percent	57	12.8
	5. 50 percent or more	78	17.2
	No response	7	1.8
	Total	469	100.0
2.7	To the best of your knowledge, what percentage of raw meat processed at this plant during the past year was imported as raw meat?		
	1. None	354	75.5
	2. 1 to 9 percent	78	16.4
	3. 10 to 24 percent	20	4.0
	4. 25 to 49 percent	7	1.5
	5. 50 percent or more	3	0.8
	No response	7	1.8
	Total	469	100.0
2.8[a]	Who conducts independent, third-party audits of this plant's further processing operations?		
	1. This plant's further processing operations are not audited by independent, third-party auditors	306	72.2
	2. Independent, third-party auditors that are hired by this plant or by corporate headquarters	82	11.5
	3. Customers of this plant	94	14.6
	4. Independent, third-party auditors that are hired by customers of this plant	70	9.2
	No response	19	4.6

(continued)

[a]Respondents could select multiple responses.

Table 5-2. Weighted Responses for Section 2 of the Meat Slaughter and Processing Survey: Further Processing (continued)

		n	%
2.9	What is the routine frequency used by this plant for sanitizing hands or gloves that contact raw meat in the further processing area of the plant?		
	1. Always before handling the next unit of product	139	33.4
	2. More than once per hour	98	20.4
	3. Once per hour	15	3.0
	4. One or more times per shift, but less than once per hour	72	11.8
	5. No specific routine frequency	130	28.1
	No response	15	3.3
	Total	469	100.0
2.10[a]	What is the routine frequency used by this plant for sanitizing hands or gloves that contact RTE product?		
	1. Always before handling the next unit of product	113	56.1
	2. More than once per hour	37	16.0
	3. Once per hour	4	1.9
	4. One or more times per shift, but less than once per hour	17	6.9
	5. No specific routine frequency	34	16.5
	No response	5	2.6
	Total	210	100.0
2.11[a]	What is the routine frequency used by this plant for sanitizing product handling equipment (such as spatulas, forks, or tongs) that contacts RTE product?		
	1. Always before handling the next unit of product	85	41.6
	2. More than once per hour	14	5.6
	3. Once per hour	2	0.5
	4. One or more times per shift, but less than once per hour	26	10.7
	5. Daily	25	12.6
	6. At the end of each production lot	21	10.5
	7. No specific routine frequency	29	14.2
	No response	8	4.4
	Total	210	100.0

(continued)

[a]Excludes respondents who do not produce RTE products.

Table 5-2. Weighted Responses for Section 2 of the Meat Slaughter and Processing Survey: Further Processing (continued)

		n	Mean pounds of annual production[a]
2.12	For each HACCP product category listed below, provide your best estimate of the total pounds produced by this plant during the past year.		
	a. Raw, ground meat (03B)	368	3,444,346
	b. Thermally processed, commercially sterile (03D)	4	*
	c. Not heat treated, shelf stable (03E)	51	55,763
	d. Heat treated, shelf stable (03F)	124	135,413
	e. Fully cooked, not shelf stable (03G)	191	1,768,763
	f. Heat treated, but not fully cooked, not shelf stable (03H)	182	842,524
	g. Secondary inhibitors, not shelf stable (03I)	46	26,964
	No response	81	—

(continued)

[a]Mean of nonzero responses.

*The mean is suppressed because of the small number of respondents.

Table 5-2. Weighted Responses for Section 2 of the Meat Slaughter and Processing Survey: Further Processing (continued)

	n	Use the practice now %	Expect to begin using the practice within 1 to 3 years %	Does not use and does not expect to use the practice within 1 to 3 years %	No response/ multiple responses/ not applicable *(write in)* %	Total %
2.13 For each practice listed below, please circle the response that applies for this plant's further processing operations.						
a. Requires and documents that suppliers who ship raw meat to this plant for further processing use stipulated practices to control pathogens	386[a]	81.6	3.8	10.9	3.7	100.0
b. Requires and documents that suppliers who ship raw meat to this plant for further processing use stipulated practices to control chemical residues (e.g., drugs or growth hormones)	355[a]	54.0	11.9	28.3	5.8	100.0
c. Treats its drains with sanitizers for pathogen control	469	79.2	7.3	10.3	3.3	100.0
d. Uses chemical sanitizers for hand tools such as knives, spatulas, or tongs used in further processing areas during operations	469	64.2	7.5	24.3	3.9	100.0
e. Rotates sanitizing chemicals it uses in the further processing area on an annual basis or more frequently	469	57.9	10.3	27.8	4.0	100.0
f. Treats food contact equipment to remove biomatter during operations	469	43.5	11.1	41.2	4.2	100.0
g. Uses antimicrobial treatment for food contact equipment during operations	469	36.1	15.6	43.7	4.6	100.0
h. Has written policies and procedures for recalling further processed product	469	71.8	10.3	14.4	3.5	100.0

(continued)

[a]Excludes respondents who answered "Not Applicable" (i.e., do not receive raw meat for further processing).

Table 5-2. Weighted Responses for Section 2 of the Meat Slaughter and Processing Survey: Further Processing (continued)

		Use the technology now	Expect to begin using the technology within 1 to 3 years	Does not use and does not expect to use the technology within 1 to 3 years	No response/ multiple responses/ not applicable *(write in)*	Total
	n	%	%	%	%	%
2.14	For each technology listed below, please circle the response that applies for this plant's further processing operations.					
a.	Conveyor belts made of materials designed to prevent bacterial growth	469	10.9	6.9	77.2	5.0	100.0
b.	Metal detection equipment	469	11.8	4.4	79.5	4.3	100.0
c.	Irradiation equipment	469	0.5	0.6	94.7	4.2	100.0
d.	High pressure processing	469	1.8	1.0	92.3	4.9	100.0
e.	Infrared technology	469	1.9	1.6	91.7	4.8	100.0
f.	Application of antimicrobial chemicals	469	38.8	7.4	49.6	4.2	100.0
g.	Other types of pasteurization	469	7.3	4.7	83.2	4.8	100.0

Table 5-3. Weighted Responses for Section 3 of the Meat Slaughter and Processing Survey: Microbiological Testing Practices

		n	%
3.1[a]	In addition to the generic *E. coli* testing of carcasses required by FSIS regulation, does this plant conduct microbiological testing using either its own lab or an independent commercial lab?		
	1. Yes	435	69.6
	2. No	163	30.4
	Total	598	100.0
3.2A	Does this plant test hides prior to slaughter?		
	1. Yes	90	17.8
	2. No	314	73.5
	No response	31	8.7
	Total	435	100.0
3.2B[b]	Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test hides prior to slaughter?		
	1. Traditional cultural methods	65	76.5
	2. Enzyme linked immunoassay (ELISA)	13	9.9
	3. Polymerase chain reaction (PCR)	19	14.2
	4. Other rapid methods	28	29.1
3.3A	Does this plant test carcasses prior to fabrication?		
	1. Yes	319	69.6
	2. No	90	23.1
	No response	26	7.3
	Total	435	100.0
3.3B[c]	Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test carcasses prior to fabrication?		
	1. Traditional cultural methods	209	66.1
	2. Enzyme linked immunoassay (ELISA)	32	7.5
	3. Polymerase chain reaction (PCR)	40	7.7
	4. Other rapid methods	59	15.8

(continued)

[a]Respondents who do not conduct microbiological testing (n = 163) skipped to Question 3.11 and are not included in the results for Questions 3.2 through 3.10.

[b]Excludes respondents who do not test hides prior to slaughter. Respondents could select multiple responses.

[c]Excludes respondents who do not test carcasses prior to fabrication. Respondents could select multiple responses.

Table 5-3. Weighted Responses for Section 3 of the Meat Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	Never	Less than once per month	Once per month	More than once per month	Once per week	More than once per week	Once per day	Once per shift	More than once per shift	No response	Total
			%	%	%	%	%	%	%	%	%	%	%
3.4[a]	For each organism listed below, how frequently is microbiological testing done on carcasses prior to fabrication?												
a.	Aerobic plate count (APC)	319	53.5	8.6	4.0	1.0	3.6	2.9	2.0	1.1	4.4	18.8	100.0
b.	Total plate count (TPC)	319	53.6	10.6	3.6	1.0	3.8	2.5	1.8	1.3	3.2	18.6	100.0
c.	Total coliforms	319	45.7	13.3	4.7	1.8	5.4	2.7	2.5	0.8	4.6	18.6	100.0
d.	Generic *E. coli* (voluntary)	319	16.3	16.2	14.6	10.6	12.6	4.3	3.9	1.4	10.1	9.8	100.0
e.	*E. coli* O157:H7	319	20.2	32.3	15.8	4.6	6.1	3.0	5.0	1.2	3.5	8.3	100.0
f.	*Staphylococcus aureus*	319	62.9	7.3	2.6	0.7	1.0	0.0	0.8	0.0	0.2	24.5	100.0
g.	*Salmonella* species	319	41.3	19.6	7.7	4.5	6.1	1.4	3.1	0.8	1.5	14.1	100.0
h.	*Listeria* species	319	48.8	19.3	8.2	3.2	2.1	0.2	0.6	0.0	0.6	17.0	100.0
i.	*Listeria monocytogenes*	319	53.7	15.2	8.0	2.8	1.6	0.2	0.6	0.0	0.2	17.8	100.0
j.	Yeasts and molds	319	71.1	5.7	1.5	0.9	0.4	0.0	0.2	0.0	0.0	20.2	100.0

(continued)

[a]Excludes respondents who do not test carcasses prior to fabrication.

Table 5-3. Weighted Responses for Section 3 of the Meat Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	%
3.5A	Does this plant test raw meat after fabrication (i.e., before processing)?		
	1. Yes	254	54.3
	2. No	151	37.4
	No response	30	8.3
	Total	435	100.0
3.5B[a]	Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test raw meat after fabrication (i.e., before processing)?		
	1. Traditional cultural methods	155	59.7
	2. Enzyme linked immunoassay (ELISA)	37	11.5
	3. Polymerase chain reaction (PCR)	43	10.6
	4. Other rapid methods	47	16.2

(continued)

[a]Excludes respondents who do not test raw meat after fabrication. Respondents could select multiple responses.

Table 5-3. Weighted Responses for Section 3 of the Meat Slaughter and Processing Survey: Microbiological Testing Practices (continued)

	n	Never	Less than once per month	Once per month	More than once per month	Once per week	More than once per week	Once per day	Once per shift	More than once per shift	No response	Total
		%	%	%	%	%	%	%	%	%	%	%
3.6[a] For each organism listed below, how frequently is microbiological testing done on raw meat after fabrication (i.e., before processing)?												
a. Aerobic plate count (APC)	254	56.7	3.4	3.7	1.5	3.4	3.8	3.5	1.2	5.9	17.0	100.0
b. Total plate count (TPC)	254	55.2	4.5	3.7	1.3	3.8	3.3	3.5	1.9	5.6	17.3	100.0
c. Total coliforms	254	49.5	6.2	4.4	1.3	3.5	3.7	3.5	2.2	6.9	18.8	100.0
d. Generic *E. coli*	254	25.8	22.0	15.9	3.8	4.9	4.8	2.8	1.9	6.2	12.0	100.0
e. *E. coli* O157:H7	254	28.0	29.1	12.8	4.3	4.2	2.6	2.8	0.8	9.4	6.0	100.0
f. *Staphylococcus aureus*	254	63.2	8.4	3.3	1.4	1.3	1.5	0.5	0.5	0.5	19.5	100.0
g. *Salmonella* species	254	37.7	23.3	8.5	4.8	2.3	3.5	1.5	1.3	4.4	12.7	100.0
h. *Listeria* species	254	48.0	19.7	9.9	2.6	1.0	0.7	1.0	1.2	1.5	14.3	100.0
i. *Listeria monocytogenes*	254	49.1	18.2	9.1	1.6	1.2	0.7	1.2	1.4	1.0	16.4	100.0
j. Yeasts and molds	254	69.7	5.3	0.6	1.9	0.8	0.3	0.5	0.5	0.2	20.3	100.0

(continued)

[a]Excludes respondents who do not test raw meat after fabrication.

Table 5-3. Weighted Responses for Section 3 of the Meat Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	%
3.7A[a]	Does this plant test ready-to-eat (RTE) finished product?		
	1. Yes	147	67.2
	2. No	34	17.4
	No response	30	15.4
	Total	211	100.0
3.7B[b]	Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test RTE finished product?		
	1. Traditional cultural methods	107	72.0
	2. Enzyme linked immunoassay (ELISA)	16	7.8
	3. Polymerase chain reaction (PCR)	8	2.9
	4. Other rapid methods	23	14.1

(continued)

[a]Excludes respondents who do not produce RTE finished product (based on response to Question 3.7).

[b]Excludes respondents who do not produce RTE finished product or do not test RTE finished product. Respondents could select multiple responses.

Table 5-3. Weighted Responses for Section 3 of the Meat Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	Never	Less than once per month	Once per month	More than once per month	Once per week	More than once per week	Once per day	Once per shift	More than once per shift	No response	Total
			%	%	%	%	%	%	%	%	%	%	
3.8[a]	For each organism listed below, how frequently is microbiological testing done on RTE finished product?												
	a. Aerobic plate count (APC)	147	63.1	7.7	3.3	0.8	0.7	1.9	0.4	1.6	0.4	20.1	100.0
	b. Total plate count (TPC)	147	58.9	11.9	2.4	1.5	1.1	1.4	0.0	1.5	0.4	20.9	100.0
	c. Total coliforms	147	59.9	13.1	2.0	0.8	0.4	2.2	0.4	1.2	0.0	20.1	100.0
	d. Generic *E. coli*	147	48.7	20.0	10.2	2.9	1.5	1.9	0.4	1.2	0.0	13.3	100.0
	e. *E. coli* O157:H7	147	54.0	18.0	7.4	4.1	0.4	1.8	0.0	0.0	0.0	14.3	100.0
	f. *Staphylococcus aureus*	147	61.6	11.0	4.5	1.2	0.4	0.7	0.0	1.6	0.0	18.9	100.0
	g. *Salmonella* species	147	38.6	29.2	9.2	4.7	0.8	0.4	0.0	1.6	0.0	15.4	100.0
	h. *Listeria* species	147	21.4	38.5	23.4	6.1	0.0	0.8	0.0	2.5	0.0	7.3	100.0
	i. *Listeria monocytogenes*	147	21.7	34.4	23.5	5.0	0.4	0.4	0.0	1.8	0.0	13.0	100.0
	j. Yeasts and molds	147	64.2	8.4	2.4	1.6	0.4	0.7	0.0	1.6	0.0	20.6	100.0
	k. *C. perfringens*	147	62.2	10.3	2.0	2.5	0.0	0.0	0.0	1.3	0.0	21.8	100.0

(continued)

[a]Excludes respondents who do not produce RTE finished product or do not test RTE finished product.

Table 5-3. Weighted Responses for Section 3 of the Meat Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	%
3.9A[a]	Does this plant test not-ready-to-eat (NRTE) finished product?		
	1. Yes	186	51.2
	2. No	101	35.7
	No response	34	13.1
	Total	321	100.0
3.9B[b]	Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test NRTE finished product?		
	1. Traditional cultural methods	118	65.1
	2. Enzyme linked immunoassay (ELISA)	27	11.4
	3. Polymerase chain reaction (PCR)	34	12.0
	4. Other rapid methods	48	22.6

(continued)

[a]Excludes respondents who do not produce NRTE finished product (based on response to Question 3.9).

[b]Excludes respondents who do not produce NRTE finished product or do not test NRTE finished product. Respondents could select multiple responses.

Table 5-3. Weighted Responses for Section 3 of the Meat Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	Never	Less than once per month	Once per month	More than once per month	Once per week	More than once per week	Once per day	Once per shift	More than once per shift	No response	Total
			%	%	%	%	%	%	%	%	%	%	%
3.10[a]	For each organism listed below, how frequently is microbiological testing done on NRTE finished product?												
	a. Aerobic plate count (APC)	186	42.4	12.3	4.3	1.8	6.2	3.6	2.4	1.8	6.3	19.0	100.0
	b. Total plate count (TPC)	186	43.4	11.9	3.0	1.8	5.8	3.2	2.8	2.8	5.9	19.4	100.0
	c. Total coliforms	186	39.5	12.4	4.5	2.3	5.1	4.3	2.4	2.8	7.6	19.0	100.0
	d. Generic *E. coli*	186	16.0	25.1	18.4	7.0	9.6	5.4	1.1	2.5	6.6	8.3	100.0
	e. *E. coli* O157:H7	186	25.6	33.0	14.9	4.8	4.1	1.5	1.4	1.1	8.1	5.5	100.0
	f. *Staphylococcus aureus*	186	54.8	14.4	3.6	2.3	2.9	1.4	0.0	1.1	0.7	18.9	100.0
	g. *Salmonella* species	186	25.3	30.5	12.4	5.4	4.1	3.9	2.5	1.4	3.8	10.7	100.0
	h. Yeasts and molds	186	63.1	9.4	4.5	0.8	1.8	0.4	0.0	0.4	0.0	19.6	100.0

(continued)

[a]Excludes respondents who do not produce NRTE finished product or do not test NRTE finished product.

Table 5-3. Weighted Responses for Section 3 of the Meat Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	%
3.11A	Does this plant conduct environmental sampling?		
	1. Yes	337	52.3
	2. No	254	46.2
	No response	7	1.5
	Total	598	100.0
3.11B[a]	What methods does this plant use to test environmental samples?		
	1. Traditional cultural methods	228	66.4
	2. Adenosine trisodium phosphate (ATP) bioluminescence	51	9.3
	3. Enzyme linked immunoassay (ELISA)	26	5.5
	4. Polymerase chain reaction (PCR)	22	3.9
	5. Other rapid methods	49	11.9

(continued)

[a]Excludes respondents who do not conduct environmental sampling. Respondents could select multiple responses.

Table 5-3. Weighted Responses for Section 3 of the Meat Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	Never	Less than once per month	Once per month	More than once per month	Once per week	More than once per week	Once per day	Once per shift	More than once per shift	No specific routine fre-quency	No response/ NA *(write in)*	Total
			%	%	%	%	%	%	%	%	%	%	%	%
3.12[a]	How frequently is environmental sampling done for each RTE area listed below?													
	a. Equipment surfaces that come into direct contact with RTE product	173	3.5	30.1	45.0	4.6	2.8	2.5	2.3	1.0	0.3	2.9	5.0	100.0
	b. Equipment surfaces that do not come into direct contact with RTE product	173	30.0	32.3	15.8	2.1	2.2	3.1	2.3	0.7	0.3	4.7	6.4	100.0
	c. Walls	173	41.5	29.5	7.8	3.7	3.4	0.9	1.0	0.7	0.0	4.2	7.2	100.0
	d. Overhead structures	173	46.3	27.9	6.4	2.5	3.4	1.0	0.3	0.0	0.0	5.0	7.2	100.0
	e. Drains	173	37.9	29.7	9.7	2.7	3.7	1.6	1.0	0.0	1.0	6.1	6.4	100.0
3.13[b]	How frequently is environmental sampling done for each NRTE area listed below?													
	a. Equipment surfaces that come into direct contact with NRTE product	228	25.8	20.7	19.2	5.6	3.5	3.3	6.1	1.7	2.2	4.8	7.1	100.0
	b. Equipment surfaces that do not come into direct contact with NRTE product	228	33.9	23.4	12.8	3.9	2.3	5.1	5.1	0.8	1.5	3.5	7.7	100.0
	c. Walls	228	45.2	23.4	9.0	3.1	3.1	1.6	1.4	0.0	0.3	5.6	7.4	100.0
	d. Overhead structures	228	47.9	21.2	8.9	3.0	2.6	1.9	0.0	0.0	0.3	6.5	7.7	100.0
	e. Drains	228	43.1	22.7	11.9	1.3	3.2	2.1	2.1	0.0	0.3	5.9	7.4	100.0

(continued)

[a]Excludes respondents who do not conduct environmental sampling and do not produce RTE finished product (based on response to Question 3.7).

[b]Excludes respondents who do not conduct environmental sampling and do not produce NRTE finished product (based on response to Question 3.9).

Table 5-3. Weighted Responses for Section 3 of the Meat Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	%
3.14[a]	How frequently does this plant's environmental sampling include testing for *Listeria* species?		
	1. Never	51	11.7
	2. Less than once per month	79	28.0
	3. Once per month	108	35.3
	4. More than once per month	20	4.9
	5. Once per week	17	3.9
	6. More than once per week	13	2.3
	7. Once per day	5	0.9
	8. Once per shift	0	0.0
	9. More than once per shift	1	0.2
	10. No specific routine frequency	29	8.5
	No response	14	4.2
	Total	337	100.0

[a]Excludes respondents who do not conduct environmental sampling.

Table 5-4. Weighted Responses for Section 4 of the Meat Slaughter and Processing Survey: Employee Training

		n	%
4.1[a]	What food safety training is provided for newly hired production employees of this plant?		
	1. No food safety training for new hires	33	6.4
	2. Written food safety training materials are given to new hires	173	23.2
	3. Informal, unscheduled on-the-job food safety training	422	72.4
	4. Scheduled on-the-job food safety training conducted by plant personnel	166	23.5
	5. Formal food safety course conducted by plant personnel	79	9.7
	6. Formal food safety course conducted by professional trainers	29	4.0
	No response	8	1.6
4.2[a]	What continuing food safety training is provided for production employees of this plant?		
	1. No continuing food safety training for employees	66	12.6
	2. Written refresher materials given to employees	74	9.4
	3. Continuing informal on-the-job food safety training	449	75.3
	4. Scheduled on-the-job refresher food safety training conducted by plant personnel	112	13.9
	5. Formal, periodic refresher course work conducted by plant personnel	90	11.0
	6. Formal, periodic refresher course work conducted by professional trainers	40	5.7
	No response	10	1.7
4.3	Approximately how many production employees currently working at this plant have completed formal HACCP training (for example, a 3 to 5 day course)?		
	1. None	62	11.9
	2. 1 to 3 employees	392	71.0
	3. 4 to 9 employees	82	10.3
	4. 10 to 20 employees	32	3.1
	5. More than 20 employees	23	2.2
	No response	7	1.4
	Total	598	100.0

[a]Respondents could select multiple responses.

Table 5-5. Weighted Responses for Section 5 of the Meat Slaughter and Processing Survey: Plant Characteristics

		n	%
5.1[a]	In what calendar year was this plant built? If recently renovated, provide the year for the renovation.		
	Year (mean response = 1980)	567	—
	1. Before 1960	71	13.5
	2. 1960–1969	52	9.4
	3. 1970–1979	117	21.1
	4. 1980–1989	65	10.7
	5. 1990–1999	135	20.9
	6. After 1999	127	19.6
	No response	31	4.8
	Total	598	100.0
5.2[a]	What is the approximate total square footage of the production space for this plant?		
	Square footage (mean response = 28,901)	539	—
	1. Under 1,000 sq. ft.	28	5.7
	2. 1,000 – 9,999	305	59.4
	3. 10,000 – 99,999	145	19.2
	4. 100,000 – 999,999	60	6.0
	5. 1,000,000 or more sq. ft.	1	0.1
	No response	59	9.6
	Total	598	100.0
		n	**Mean**
5.3	Calculated as a percentage of total square footage given in Question 5.2, what is the approximate percentage of the square footage of the production space of this plant that is under 5 years old, 5 years to just under 20 years old, or 20 year old or more?		
	1. Under 5 years old		11.6%
	2. 5 years to just under 20 years old		23.3%
	3. 20 years old or more		65.1%
	Total	537[b]	100.0%
	No response	61	—

(continued)

[a]Respondents wrote in a number to answer this question. For reporting purposes, we grouped the responses into the categories shown.

[b]Respondents' answers were excluded from the analysis if the sum of their responses was less than 80 percent or greater than 120 percent (n=11).

Table 5-5. Weighted Responses for Section 5 of the Meat Slaughter and Processing Survey: Plant Characteristics (continued)

		n	%
5.4	How many slaughter and fabrication shifts does this plant operate daily?		
	1. This plant does not operate on a daily basis	68	13.9
	2. One	486	81.5
	3. Two	41	4.1
	4. Three	0	0.0
	No response/NA *(write in)*	3	0.5
	Total	598	100.0
5.5	How many further processing shifts does this plant operate daily?		
	1. None	236	39.0
	2. Further processing shift is not operated on a daily basis	69	12.5
	3. One	249	43.6
	4. Two	39	4.1
	5. Three	2	0.3
	No response	3	0.5
	Total	598	100.0
5.6	How many clean up shifts does this plant operate daily? This includes cleanups conducted by production and processing personnel, sanitation crews, and contractors.		
	1. None	22	4.3
	2. Clean up shift is not operated on a daily basis	23	4.5
	3. One	456	75.2
	4. Two	75	13.0
	5. Three	20	2.5
	No response	2	0.4
	Total	598	100.0
5.7[a]	Approximately how many people are employed at this plant?		
	Full-time equivalents (mean response = 107)	584	—
	1. Fewer than 10	303	61.8
	2. Between 10 and 499	230	31.4
	3. 500 or more	51	4.6
	No response	14	2.1
	Total	598	100.0

(continued)

[a]Respondents wrote in a number to answer this question. For reporting purposes, we grouped the responses into the categories shown.

Table 5-5. Weighted Responses for Section 5 of the Meat Slaughter and Processing Survey: Plant Characteristics (continued)

		n	%
5.8	Does this plant have a person on staff whose primary responsibility is to manage food safety activities at the plant (i.e., food safety manager)?		
	1. Yes	329	49.3
	2. No	264	49.7
	No response	5	1.0
	Total	598	100.0
5.9[a]	Approximately what percentage of this plant's food safety manager's time is devoted to managing food safety activities at the plant?		
	1. 1 to 24 percent	80	29.8
	2. 25 to 49 percent	69	24.2
	3. 50 to 74 percent	43	11.5
	4. 75 to 99 percent	61	13.5
	5. 100 percent	60	15.7
	No response	16	5.3
	Total	329	100.0
5.10	Does this plant have a quality control/quality assurance department?		
	1. Yes	214	27.2
	2. No	377	71.5
	No response	7	1.3
	Total	598	100.0
5.11[b]	Approximately how many employees at this plant work in the plant's quality control/quality assurance department?		
	Full-time equivalents (mean response = 11)	201	—
	1. Fewer than 5	131	67.0
	2. Between 6 and 25	31	12.7
	3. Between 26 and 50	23	7.6
	4. 51 or more	16	5.3
	No response	13	7.4
	Total	214	100.0

(continued)

[a]Excludes respondents who do not have a food safety manager.

[b]Excludes respondents who do not have a QC/QA department. Respondents wrote in a number to answer this question. For reporting purposes, we grouped the responses into the categories shown.

Table 5-5. Weighted Responses for Section 5 of the Meat Slaughter and Processing Survey: Plant Characteristics (continued)

		n	%
5.12	How many USDA or state inspected plants are owned by the company that owns this plant?		
	1. 1	488	87.8
	2. 2 to 5	49	5.8
	3. 6 to 20	28	2.6
	4. 21 or more	24	2.2
	No response/not applicable *(write in)*	9	1.6
	Total	598	100.0
5.13	What was the approximate value of total plant sales revenue for the most recently completed fiscal year?		
	1. Under $2.5 million	379	75.1
	2. $2.5 million to $24.9 million	87	10.9
	3. $25 million to $49.9 million	19	1.8
	4. $50 million to $99.9 million	18	1.8
	5. $100 million to $249.9 million	16	1.5
	6. $250 million to $499.9 million	18	1.7
	7. $500 million to $999.9 million	15	1.4
	8. $1 billion or more	12	1.1
	No response	34	4.8
	Total	598	100.0

Table 5-6. Percentage of Meat Slaughter and Processing Plants that Routinely Sanitize Hands or Gloves, by HACCP Size

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Routine frequency after contact with raw product in slaughter area	(n = 391)			(n = 154)			(n = 53)			(n = 598)		
Always before handling next unit of product	46.1	42.0	50.4	40.9	36.5	45.4	30.2	24.9	36.0	44.6	41.2	48.1
More than once per hour	16.7	13.8	20.2	20.1	16.7	24.0	26.4	21.4	32.1	17.7	15.2	20.5
Once per hour	1.1	0.5	2.5	2.6	1.5	4.5	1.9	0.8	4.5	1.3	0.8	2.3
One or more times per shift, but less than once per hour	2.2	1.3	3.8	12.3	9.7	15.6	28.3	23.2	34.0	5.0	4.0	6.2
No specific routine frequency	30.7	27.0	34.7	18.8	15.5	22.6	13.2	9.6	17.9	28.1	25.1	31.4
No response	3.1	1.9	5.0	5.2	3.5	7.7	0.0	0.0	0.0	3.3	2.2	4.7
Total	100.0			100.0			100.0			100.0		
Routine frequency after contact with raw product in fabrication area[a]	(n = 388)			(n = 148)			(n = 53)			(n = 589)		
Always before handling next unit of product	33.6	29.7	37.8	10.8	8.1	14.2	1.9	0.8	4.5	28.8	25.6	32.2
More than once per hour	20.4	17.2	24.1	23.0	19.2	27.3	9.4	6.4	13.6	20.3	17.6	23.3
Once per hour	3.1	1.9	5.0	2.0	1.0	3.9	1.9	0.8	4.5	2.9	1.9	4.4
One or more times per shift, but less than once per hour	6.3	4.6	8.7	34.5	30.1	39.0	58.5	52.4	64.3	13.0	11.3	14.9
No specific routine frequency	32.8	29.0	36.9	24.3	20.4	28.7	28.3	23.2	34.0	31.4	28.2	34.7
No response	3.6	2.3	5.6	5.4	3.6	8.0	0.0	0.0	0.0	3.7	2.6	5.3
Total	100.0			100.0			100.0			100.0		

(continued)

[a]Excludes respondents who wrote in "not applicable;" these respondents may not have fabrication areas.

Table 5-6. Percentage of Meat Slaughter and Processing Plants that Routinely Sanitize Hands or Gloves, by HACCP Size (continued)

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Routine frequency after contact with raw meat in further processing area	(n = 332)			(n = 97)			(n = 40)			(n = 469)		
Always before handling next unit of product	37.6	33.2	42.3	15.5	10.8	21.7	0.0	0.0	0.0	33.4	29.6	37.4
More than once per hour	19.7	16.2	23.7	26.8	20.6	34.1	17.5	11.2	26.3	20.4	17.3	23.9
Once per hour	2.9	1.7	4.9	5.2	2.7	9.7	0.0	0.0	0.0	3.0	1.9	4.7
One or more times per shift, but less than once per hour	7.7	5.6	10.6	22.7	17.0	29.6	60.0	50.1	69.2	11.8	9.7	14.2
No specific routine frequency	28.7	24.6	33.1	26.8	20.6	34.1	20.0	13.2	29.1	28.1	24.5	31.9
No response	3.4	2.0	5.7	3.1	1.3	7.0	2.5	0.7	8.3	3.3	2.1	5.2
Total	100.0			100.0			100.0			100.0		
Routine frequency after contact with RTE product (for plants that produce RTE product)	(n = 158)			(n = 44)			(n = 8)			(n = 210)		
Always before handling next unit of product	58.7	51.2	65.8	45.5	32.5	59.1	0.0	0.0	0.0	56.1	49.5	62.5
More than once per hour	14.4	9.9	20.4	20.5	11.7	33.3	62.5	28.2	87.6	16.0	11.8	21.3
Once per hour	1.9	0.7	5.5	2.3	0.4	11.6	0.0	0.0	0.0	1.9	0.7	4.9
One or more times per shift, but less than once per hour	5.6	3.0	10.2	11.4	5.2	23.1	37.5	12.4	71.8	6.9	4.3	10.8
No specific routine frequency	16.7	11.8	23.0	18.2	10.0	30.8	0.0	0.0	0.0	16.5	12.1	22.1
No response	2.7	1.1	6.6	2.3	0.4	11.6	0.0	0.0	0.0	2.6	1.1	5.9
Total	100.0			100.0			100.0			100.0		

Table 5-7. Percentage of Meat Slaughter and Processing Plants Currently Using the Technology, by HACCP Size

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Technologies for slaughter and fabrication	(n = 391)			(n = 154)			(n = 53)			(n = 598)		
Company-owned lab for microbiological testing	9.0	6.9	11.6	35.1	30.9	39.5	88.7	84.2	92.0	16.7	14.8	18.8
Bioluminescent testing system	2.6	1.5	4.4	21.4	18.0	25.3	58.5	52.4	64.3	8.1	6.9	9.4
Conveyor belts made from materials designed to prevent bacterial growth	3.5	2.2	5.3	29.2	25.3	33.5	41.5	35.7	47.6	9.1	7.9	10.6
Steam pasteurization systems (for example, the Frigoscandia)	2.3	1.3	3.9	16.2	13.2	19.8	49.1	43.1	55.1	6.6	5.5	7.8
Steam vacuum units	1.9	1.1	3.4	34.4	30.4	38.7	81.1	75.9	85.4	10.6	9.5	11.8
Organic acid rinse	48.4	44.3	52.5	66.2	61.9	70.3	83.0	78.0	87.1	52.7	49.3	56.1
Positive air pressure from clean side to dirty side	5.8	4.1	8.1	33.8	29.7	38.1	79.2	73.9	83.7	13.5	11.9	15.3
Metal detection equipment	2.2	1.3	3.7	37.0	32.9	41.4	98.1	95.5	99.2	12.0	10.9	13.2
Tempered carcass rinse/wash	43.0	38.9	47.2	49.4	44.8	53.9	75.5	69.9	80.3	45.5	42.1	48.9
Hock suckers	0.5	0.2	1.4	5.2	3.5	7.6	32.1	26.7	38.0	2.7	2.2	3.3
Equipment for removal of spinal cord prior to carcass splitting	14.6	11.8	17.8	14.3	11.4	17.8	13.2	9.6	17.9	14.5	12.2	17.1
Technologies for further processing operations	(n = 332)			(n = 97)			(n = 40)			(n = 469)		
Conveyor belts made from materials designed to prevent bacterial growth	6.3	4.4	9.1	33.0	26.2	40.5	40.0	30.8	49.9	10.9	8.9	13.3
Metal detection equipment	3.2	1.9	5.3	40.2	33.1	47.8	100.0	100.0	100.0	11.8	10.2	13.5
Irradiation equipment	0.7	0.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	1.9
High pressure processing	2.2	1.1	4.1	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.9	3.5
Infrared technology	1.2	0.5	2.8	1.0	0.2	4.5	17.5	11.2	26.3	1.9	1.2	3.1
Application of antimicrobial chemicals	35.5	31.2	40.2	52.6	45.0	60.1	65.0	55.1	73.8	38.8	35.0	42.8
Other types of pasteurization	6.0	4.1	8.7	11.3	7.3	17.2	20.0	13.2	29.1	7.3	5.5	9.5

Table 5-8. Percentage of Meat Slaughter and Processing Plants Currently Using the Pathogen-Control Practice, by HACCP Size

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Practices for slaughter and fabrication	(n = 391)			(n = 154)			(n = 53)			(n = 598)		
Requires and documents that its animal growers use stipulated production practices to control pathogens	9.2	7.0	12.0	14.3	11.4	17.8	17.0	12.9	22.0	10.3	8.5	12.6
Requires and documents that its animal growers use stipulated production practices to control chemical residues (e.g., drugs and growth hormones)	20.9	17.7	24.6	42.2	37.8	46.8	84.9	80.1	88.7	27.2	24.4	30.1
Rotates sanitizing chemicals it uses in the slaughter area on an annual basis or more frequently	47.9	43.7	52.2	65.6	61.2	69.7	94.3	90.8	96.6	52.8	49.3	56.2
Uses chemical sanitizers for food contact hand tools used in the slaughter area during operations	50.6	46.4	54.8	53.2	48.7	57.7	58.5	52.4	64.3	51.4	47.9	54.8
Uses sterilizer pots for heat sterilization of hand tools used in the slaughter area during operations	95.1	93.0	96.7	97.4	95.4	98.6	100.0	100.0	100.0	95.7	94.0	97.0
Has written policies and procedures for recalling product	72.0	68.1	75.6	76.0	71.9	79.6	100.0	100.0	100.0	73.9	70.7	76.9
Has written policies and procedures to protect against bioterrorism	24.6	21.2	28.4	38.3	34.0	42.8	90.6	86.4	93.6	29.8	26.9	32.9
Has written policies and procedures to control the use of hazardous chemicals	71.5	67.6	75.1	82.5	78.7	85.7	100.0	100.0	100.0	74.5	71.3	77.4
Has written policies and procedures that stipulate humane handling of animals	74.7	70.8	78.2	85.1	81.5	88.0	100.0	100.0	100.0	77.5	74.3	80.3

(continued)

Table 5-8. Percentage of Meat Slaughter and Processing Plants Currently Using the Pathogen-Control Practice, by HACCP Size (continued)

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Identifies and tracks its products, by production lot, backward to specific animal growers	52.1	47.9	56.3	51.3	46.8	55.8	62.3	56.3	67.9	52.5	49.0	55.9
Identifies and tracks its products, by production lot, forward to specific buyers (not consumers) of its products	49.0	44.8	53.2	67.5	63.2	71.6	86.8	82.1	90.4	53.5	50.1	57.0
Practices for further processing operations	(n = 332)			(n = 97)			(n = 40)			(n = 469)		
Requires and documents that raw meat suppliers use stipulated practices to control pathogens[a]	81.7	77.2	85.4	78.9	69.9	85.7	87.1	75.6	93.6	81.6	77.7	84.9
Requires and documents that raw meat suppliers use stipulated practices to control chemical residues (e.g., drugs or growth hormones)[a]	54.4	48.8	59.8	51.5	41.7	61.1	53.3	40.0	66.2	54.0	49.1	58.8
Treats its drains with sanitizers for pathogen control	77.6	73.5	81.3	84.5	78.2	89.3	95.0	88.5	97.9	79.2	75.6	82.4
Uses chemical sanitizers for hand tools such as knives, spatulas, or tongs used in further processing areas during operations	63.1	58.4	67.5	70.1	62.7	76.6	70.0	60.3	78.2	64.2	60.2	68.0
Rotates sanitizing chemicals it uses in the further processing area on an annual basis or more frequently	54.2	49.5	58.9	72.2	65.1	78.3	90.0	82.3	94.6	57.9	53.8	61.9
Treats food contact equipment to remove biomatter during operations	42.7	38.0	47.4	48.5	41.1	55.9	47.5	37.9	57.3	43.5	39.5	47.6

(continued)

[a]Excludes respondents who answered "not applicable" (i.e., do not receive raw meat for further processing).

Table 5-8. Percentage of Meat Slaughter and Processing Plants Currently Using the Pathogen-Control Practice, by HACCP Size (continued)

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Uses antimicrobial treatment for food contact equipment during operations	33.2	28.9	37.8	49.5	42.0	57.0	57.5	47.6	66.9	36.1	32.3	40.1
Has written policies and procedures for recalling further processed product	69.5	64.9	73.6	78.4	71.5	83.9	100.0	100.0	100.0	71.8	67.9	75.4

Table 5-9. Percentage of Meat Slaughter and Processing Plants with Microbiological Testing Practices, by HACCP Size

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Conducts microbiological testing	(n = 391)			(n = 154)			(n = 53)			(n = 598)		
Conducts voluntary microbiological testing	65.5	61.4	69.4	82.5	78.8	85.6	98.1	95.5	99.2	69.6	66.2	72.7
Testing practices for hides	(n = 256)			(n = 127)			(n = 52)			(n = 435)		
Tests hides prior to slaughter	13.6	10.1	17.9	26.0	21.3	31.2	44.2	38.1	50.6	17.8	15.0	21.1
Methods of testing used[a]	(n = 34)			(n = 33)			(n = 23)			(n = 90)		
Traditional cultural methods	85.4	68.7	94.0	66.7	50.2	79.9	60.9	43.6	75.8	76.5	66.9	83.9
Enzyme linked immunoassay (ELISA)	0.0	0.0	0.0	24.2	—	—	21.7	—	—	9.9	—	—
Polymerase chain reaction (PCR)	0.0	0.0	0.0	21.2	—	—	52.2	—	—	14.2	—	—
Other rapid methods	23.9	12.3	41.5	42.4	27.7	58.6	26.1	13.9	43.5	29.1	20.3	39.7
Testing practices for carcasses	(n = 256)			(n = 127)			(n = 52)			(n = 435)		
Tests carcasses prior to fabrication	64.4	58.9	69.5	81.1	76.1	85.3	98.1	95.3	99.2	69.6	65.3	73.6
Methods of testing used[a]	(n = 165)			(n = 103)			(n = 51)			(n = 319)		
Traditional cultural methods	67.2	60.0	73.6	66.0	58.9	72.5	58.8	52.2	65.2	66.1	61.0	71.0
ELISA	3.2	1.4	7.1	18.4	13.6	24.6	15.7	11.4	21.1	7.5	5.6	10.0
PCR	0.0	0.0	0.0	15.5	11.1	21.4	47.1	40.5	53.7	7.7	6.5	9.0
Other rapid methods	11.8	7.9	17.1	22.3	17.0	28.8	31.4	25.6	37.8	15.8	12.6	19.6

(continued)

[a]Respondents could select multiple responses.

Note: "—" indicates that the confidence interval could not be estimated because there was only one observation (respondent) in a stratum for that question.

Table 5-9. Percentage of Meat Slaughter and Processing Plants with Microbiological Testing Practices, by HACCP Size (continued)

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Testing practices for raw meat	(n = 256)			(n = 127)			(n = 52)			(n = 435)		
Tests raw meat after fabrication (i.e., before processing)	48.5	42.9	54.1	64.6	58.9	69.9	92.3	88.2	95.1	54.3	49.9	58.6
Methods of testing used[a]	(n = 124)			(n = 82)			(n = 48)			(n = 254)		
Traditional cultural methods	57.0	48.5	65.1	63.4	54.8	71.3	68.7	61.4	75.3	59.7	53.6	65.5
ELISA	6.3	3.2	11.8	25.6	18.8	33.8	16.7	11.8	23.0	11.5	8.7	15.2
PCR	0.0	0.0	0.0	22.0	—	—	52.1	—	—	10.6	—	—
Other rapid methods	12.5	8.0	19.2	23.2	16.7	31.2	25.0	19.1	32.0	16.2	12.5	20.7
Testing practices for ready-to-eat (RTE) finished products (for plants that produce RTE product)	(n = 157)			(n = 46)			(n = 8)			(n = 211)		
Tests RTE finished products	63.7	56.4	70.5	87.0	75.4	93.5	100.0	100.0	100.0	67.2	60.7	73.0
Methods of testing used[a]	(n = 99)			(n = 40)			(n = 8)			(n = 147)		
Traditional cultural methods	71.4	61.9	73.3	75.0	60.9	85.3	75.0	37.3	93.8	72.0	64.0	78.9
ELISA	4.1	1.6	10.3	17.5	9.1	31.0	62.5	28.2	87.6	7.8	4.8	12.4
PCR	0.0	0.0	0.0	7.5	—	—	62.5	—	—	2.9	—	—
Other rapid methods	12.2	7.1	20.1	22.5	12.8	36.5	25.0	6.2	62.7	14.1	9.4	20.6

(continued)

[a]Respondents could select multiple responses.

Note: "—" indicates that the confidence interval could not be estimated because there was only one observation (respondent) in a stratum for that question.

Table 5-9. Percentage of Meat Slaughter and Processing Plants with Microbiological Testing Practices, by HACCP Size (continued)

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Testing practices for not-ready-to-eat (NRTE) finished products (for plants that produce NRTE product)	(n = 191)			(n = 84)			(n = 46)			(n = 321)		
Tests NRTE finished product	41.3	34.9	47.9	77.4	69.5	83.7	93.5	88.2	96.5	51.2	46.1	56.3
Methods of testing used[a]	(n = 78)			(n = 65)			(n = 43)			(n = 186)		
Traditional cultural methods	68.1	57.1	77.4	61.5	51.2	70.9	58.1	49.1	66.7	65.1	57.9	71.6
ELISA	5.0	1.9	12.6	24.6	16.8	34.5	16.3	10.7	24.0	11.4	8.1	15.7
PCR	0.0	0.0	0.0	23.1	15.5	32.9	44.2	35.5	53.2	12.0	9.8	14.7
Other rapid methods	16.5	9.9	26.3	29.2	20.8	39.4	37.2	29.0	46.2	22.6	17.5	28.7
Testing practices for environmental sampling	(n = 391)			(n = 154)			(n = 53)			(n = 598)		
Conducts environmental sampling	46.7	42.6	50.9	68.8	64.5	72.9	94.3	90.8	96.6	52.3	48.9	55.7
Methods of testing used[a]	(n = 181)			(n = 106)			(n = 50)			(n = 337)		
Traditional cultural methods	64.4	57.6	70.6	70.8	64.0	76.7	74.0	67.5	79.6	66.4	61.4	71.2
Adenosine trisodium phosphate (ATP) bioluminescence	0.5	0.1	3.0	25.5	19.9	31.9	46.0	39.2	52.9	9.3	8.0	10.9
ELISA	2.2	0.9	5.4	13.2	9.2	18.6	16.0	11.6	21.7	5.5	4.0	7.6
PCR	0.0	0.0	0.0	6.6	—	—	30.0	—	—	3.9	—	—
Other rapid methods	8.0	5.0	12.5	20.8	15.7	26.9	24.0	18.6	30.4	11.9	9.3	15.1
Tests for *Listeria* species once per week or more often	2.2	0.9	5.4	16.0	11.5	21.9	30.0	24.1	36.7	7.3	5.7	9.4

(continued)

[a]Respondents could select multiple responses.

Note: "—" indicates that the confidence interval could not be estimated because there was only one observation (respondent) in a stratum for that question.

Table 5-9. Percentage of Meat Slaughter and Processing Plants with Microbiological Testing Practices, by HACCP Size (continued)

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Conducts environmental sampling of RTE area once per week or more often (for plants that produce RTE product)	(n = 125)			(n = 40)			(n = 8)			(n = 173)		
Equipment surfaces that come into direct contact with RTE product	2.4	0.8	7.0	37.5	24.7	52.3	87.5	45.8	98.3	8.9	6.4	12.3
Equipment surfaces that do *not* come into direct contact with RTE product	2.4	0.8	7.0	35.0	22.6	49.8	87.5	45.8	98.3	8.6	6.1	12.0
Walls	1.7	0.5	6.3	27.5	16.5	42.2	50.0	19.8	80.2	6.1	3.9	9.4
Overhead structures	0.9	0.1	5.5	22.5	12.6	36.9	50.0	19.8	80.2	4.8	3.0	7.6
Drains	3.3	1.3	8.2	25.0	14.5	39.6	62.5	28.2	87.6	7.4	4.8	11.3
Conducts environmental sampling of NRTE area once per week or more often (for plants that produce NRTE product)	(n = 133)			(n = 58)			(n = 37)			(n = 228)		
Equipment surfaces that come into direct contact with NRTE product	3.8	1.6	8.5	41.4	30.8	52.9	83.8	74.1	90.3	16.8	14.0	20.1
Equipment surfaces that do *not* come into direct contact with NRTE product	3.8	1.6	8.5	34.5	24.6	45.9	73.0	62.3	81.5	14.8	12.0	18.1
Walls	1.6	0.4	5.9	19.0	11.6	29.5	24.3	16.2	34.8	6.4	4.4	9.1
Overhead structures	0.8	0.1	5.1	17.2	10.2	27.6	16.2	9.7	25.9	4.7	3.2	7.0
Drains	4.0	1.8	9.0	19.0	11.6	29.5	18.9	11.8	28.9	7.7	5.2	11.2

Table 5-10. Percentage of Meat Slaughter and Processing Plants with Training for Production Employees, by HACCP Size

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Food safety training for newly hired employees[a]	(n = 391)			(n = 154)			(n = 53)			(n = 598)		
No training for new hires	7.5	5.6	10.1	2.6	1.4	4.6	0.0	0.0	0.0	6.4	4.8	8.5
Written food safety training materials are given to new hires	15.8	13.0	19.2	44.8	40.4	49.3	79.2	73.9	83.7	23.2	20.7	25.9
Informal, unscheduled on-the-job food safety training	74.8	71.0	78.3	64.9	60.5	69.1	54.7	48.7	60.6	72.4	69.3	75.3
Scheduled on-the-job food safety training conducted by plant personnel	17.9	14.8	21.4	38.3	34.1	42.7	71.7	66.0	76.8	23.5	20.9	26.3
Formal food safety course conducted by plant personnel	5.2	3.6	7.4	19.5	16.2	23.2	54.7	48.7	60.6	9.7	8.2	11.4
Formal food safety course conducted by professional trainers	2.9	1.8	4.8	4.5	3.0	6.8	20.8	16.3	26.1	4.0	2.9	5.4
Continuing food safety training[a]	(n = 391)			(n = 154)			(n = 53)			(n = 598)		
No continuing training	14.5	11.8	17.8	6.5	4.6	9.2	0.0	0.0	0.0	12.6	10.4	15.3
Written refresher materials given to employees	5.6	4.0	8.0	18.8	15.5	22.6	43.4	37.5	49.5	9.4	7.9	11.2
Continuing informal on-the-job food safety training	75.8	72.0	79.2	74.0	69.8	77.8	71.7	66.0	76.8	75.3	72.2	78.2
Scheduled on-the-job refresher food safety training conducted by plant personnel	7.9	5.9	10.4	30.5	26.5	34.8	64.2	58.2	69.7	13.9	12.1	16.0
Formal, periodic refresher course work conducted by plant personnel	5.7	4.0	8.0	24.7	21.0	28.8	56.6	50.5	62.5	11.0	9.4	12.8
Formal, periodic refresher course work conducted by professional trainers	4.3	2.8	6.4	7.1	5.2	9.8	24.5	19.7	30.1	5.7	4.3	7.3
HACCP training	(n = 391)			(n = 154)			(n = 53)			(n = 598)		
One or more production employees has completed formal HACCP training	84.0	80.7	86.8	97.4	95.5	98.5	98.1	95.5	99.2	86.7	84.0	88.9

[a]Respondents could select multiple responses.

Table 5-11. Percentage of Meat Slaughter and Processing Plants that Have Operations Audited by Independent Third Parties, by HACCP Size

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Slaughter and fabrication operations[a]	(n = 391)			(n = 154)			(n = 53)			(n = 598)		
Not audited	84.1	80.7	86.9	39.0	34.6	43.5	3.8	2.0	6.9	73.5	70.8	76.0
Auditors hired by plant or corporate headquarters	2.3	1.3	3.9	28.6	24.7	32.7	94.3	90.8	96.6	10.6	9.5	11.8
Customers	8.4	6.3	11.0	30.5	26.5	34.8	79.2	73.9	83.7	15.1	13.2	17.2
Auditors hired by customers	2.0	1.1	3.6	29.9	26.0	34.1	81.1	75.9	85.4	10.0	8.9	11.2
Further processing operations[a]	(n = 332)			(n = 97)			(n = 40)			(n = 469)		
Not audited	80.5	76.4	83.9	40.2	33.1	47.7	0.0	0.0	0.0	72.2	68.9	75.4
Auditors hired by plant or corporate headquarters	4.8	3.1	7.2	27.8	21.6	35.1	97.5	91.7	99.3	11.5	9.8	13.5
Customers	8.5	6.3	11.5	34.0	27.2	41.5	80.0	70.9	86.8	14.6	12.4	17.1
Auditors hired by customers	2.4	1.3	4.4	34.0	27.2	41.5	72.5	62.9	80.4	9.2	7.8	10.9

[a]Respondents could select multiple responses.

Table 5-12. Meat Slaughter and Processing Plants' Responses to Other Selected Questions, by HACCP Size

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Percentage of live animals slaughtered during past year that were imported	(n = 391)			(n = 154)			(n = 53)			(n = 598)		
None	97.9	96.2	98.8	70.8	66.5	74.7	58.5	52.4	64.3	91.9	90.6	93.1
1 to 9 percent	0.3	0.0	1.5	9.1	6.8	12.0	28.3	23.2	34.0	2.9	2.4	3.6
10 to 24 percent	0.0	0.0	0.0	6.5	4.6	9.1	5.7	3.4	9.2	1.2	0.9	1.7
25 to 49 percent	0.0	0.0	0.0	3.9	2.5	6.0	1.9	0.8	4.5	0.7	0.5	1.0
50 percent or more	1.0	0.4	2.3	4.5	3.0	6.8	0.0	0.0	0.0	1.5	0.9	2.4
No response	0.8	0.3	2.2	5.2	3.5	7.7	5.7	3.4	9.2	1.7	1.1	2.6
Total	100.0			100.0			100.0			100.0		
Annual production for raw product, not ground, primal cuts (HACCP code 03C)	(n = 391)			(n = 154)			(n = 53)			(n = 598)		
None	15.9	13.1	19.2	17.5	14.3	21.3	0.0	0.0	0.0	15.4	13.1	18.0
1 to 99,999 pounds	28.6	25.0	32.6	7.1	5.1	9.9	0.0	0.0	0.0	24.1	21.1	27.3
100,000 to 999,999 pounds	26.9	23.3	30.8	10.4	7.9	13.5	0.0	0.0	0.0	23.1	20.2	26.3
1,000,000 to 9,999,999 pounds	3.4	2.2	5.2	19.5	16.1	23.4	1.9	0.8	4.5	5.8	4.6	7.2
10,000,000 to 99,999,999 pounds	0.2	0.0	1.1	20.1	16.8	23.9	3.8	2.0	6.9	3.4	2.8	4.1
100,000,000 to 999,999,999 pounds	0.3	0.0	1.5	7.1	5.2	9.8	73.6	67.9	78.6	4.8	4.3	5.4
1,000,000,000 or more pounds	0.0	0.0	0.0	0.0	0.0	0.0	5.7	3.4	9.2	0.3	0.2	0.4
No response/NA *(write in)*	24.6	21.1	28.5	18.2	14.9	22.0	15.1	11.3	19.9	23.2	20.3	26.3
Total	100.0			100.0			100.0			100.0		
Food safety manager	(n = 391)			(n = 154)			(n = 53)			(n = 598)		
Food safety manager on staff	41.8	37.7	46.1	74.0	70.0	77.7	96.2	93.1	98.0	49.3	45.9	52.6

6 Survey Results: Poultry Slaughter and Processing Plants

Tables 6-1 through 6-5 provide weighted tabulations for poultry slaughter and processing plants (n = 219). The survey results are representative of the population of poultry slaughter and processing plants as defined in Section 2. Some regulated establishments were excluded from the sampling frame (e.g., plants that slaughter only ducks or plants that are university facilities) so that the sampling frame was representative of the vast majority of FSIS and state-inspected plants.

We computed proportions for questions in which respondents could select one or more responses from a list of responses. The number of respondents (n) for each response item is provided in the tables. We computed means for questions that required a numeric response from respondents. The number of respondents (n) used in mean calculations is provided in the tables.

Tables 6-6 through 6-12 provide weighted cross-tabulations for selected questions by HACCP size. In addition to the estimated proportions, we provide the 95 percent CIs for the point estimates.

A summary of the survey findings, based on the overall results presented in Tables 6-1 through 6-5, is provided below.

Slaughter and Deboning

- About 80 percent of poultry plants have their slaughter and deboning operations audited by independent, third-party auditors.

- More than 77 percent of plants sanitize hands or gloves that contact raw poultry in the slaughter and deboning areas of the plant once per shift or more often.
- Poultry plants have adopted pathogen-control technologies such as inside-outside bird washers (85 percent) and metal detection equipment (59 percent).
- Seventy percent of poultry plants have a company-owned lab for microbiological testing.
- With the exception of sterilizer pots, the majority of poultry plants have adopted the pathogen-control practices for slaughter and deboning operations asked about in Question 1.7 in Table 6-1.
- Most poultry plants have written policies and procedures for controlling the use of hazardous chemicals (89 percent), recalling product (87 percent), and humane handling of birds (83 percent).
- Sixty-seven percent of poultry plants have written policies and procedures to protect against bioterrorism; approximately 80 percent of plants can identify and track their products one step backward and forward.
- Three percent of poultry plants import live birds from other countries for slaughter.

Further Processing

- More than half of all poultry slaughter plants also perform processing activities.
- For poultry plants with further processing activities, 24 percent produce RTE products, 87 percent produce NRTE products, and 61 percent produce inputs to further processing by another plant.
- More than 80 percent of poultry plants have their further processing operations audited by independent, third-party auditors.
- More than 80 percent of poultry plants sanitize hands or gloves that contact raw poultry or RTE product in the further processing area of the plant once per shift or more often.
- The majority of poultry plants have adopted the pathogen-control processes for further processing asked about in Question 2.9 in Table 6-2.
- Seventy-seven percent of poultry plants use metal detection equipment; the majority of plants have not

adopted the other pathogen-control technologies for further processing in Question 2.10 in Table 6-2.

- Five percent of poultry plants import raw poultry from other countries for further processing.

Microbiological Testing Practices

- Eighty-five percent of poultry plants conduct microbiological testing using either their own lab or an independent commercial lab (in addition to the *E. coli* testing of carcasses required by FSIS regulations).
- Eighty-six percent of poultry plants test carcasses prior to deboning; the majority (73 percent) use traditional cultural methods. The majority test for *Salmonella* species (90 percent) and generic *E. coli* (in addition to mandatory testing) (76 percent). About half conduct APC, TPC, and total coliform testing.
- Sixty-three percent of poultry plants test raw poultry after deboning; the majority (80 percent) use traditional cultural methods. About two-thirds conduct APC and TPC testing. About half test for total coliforms, *Salmonella* species, and generic *E. coli*.
- For poultry plants that produce RTE finished product, 95 percent test their product; the majority use traditional cultural methods (87 percent). The majority test for total coliforms, *Salmonella* species, generic *E. coli*, *Staphylococcus aureus*, *Listeria* species, and *Listeria monocytogenes* and conduct APC and TPC testing.
- For poultry plants that produce NRTE finished product, 79 percent test their product; the majority use traditional cultural methods (81 percent). The majority test for total coliforms, *Salmonella* species, and generic *E. coli* and conduct APC and TPC testing.
- Seventy-five percent of poultry plants conduct environmental sampling; the majority use traditional cultural methods (74 percent) and sample equipment surfaces. Most plants that produce RTE finished product also sample walls, overhead structures, and drains.
- For poultry plants conducting environmental sampling, 26 percent test for *Listeria* species on a routine basis.

Employee Training

- Sixty-eight percent of poultry plants provide written food safety training materials to new hires, and 58 percent provide informal, unscheduled on-the-job training.

- More than 70 percent of poultry plants provide informal, unscheduled on-the-job training for current employees.
- The majority (94 percent) of poultry plants have employees that have attended formal HACCP training.

Plant Characteristics

- Fifty-seven percent of poultry plants operate two or more shifts per day for slaughter and evisceration; some plants also have more than one shift for deboning and further processing operations.
- The majority of poultry plants (71 percent) operate one clean-up shift per day.
- Many poultry plants report that they have a food safety manager (74 percent) and a QC/QA department (88 percent).
- Fifty-eight percent of poultry plants have annual sales revenue of $25 million or more, and 67 percent are part of a company that owns other USDA- or state-inspected plants.

Table 6-1. Weighted Responses for Section 1 of the Poultry Slaughter and Processing Survey: Slaughter and Deboning

		n	%
1.1[a]	Who conducts independent, third-party audits of this plant's slaughter and deboning operations?		
	1. This plant's slaughter and deboning operations are not audited by independent, third-party auditors	34	19.4
	2. Independent, third-party auditors that are hired by this plant or by corporate headquarters	137	58.7
	3. Customers of this plant	112	48.1
	4. Independent, third-party auditors that are hired by customers of this plant	112	47.7
	No response	6	3.0
1.2	What is the routine frequency used by this plant for sanitizing hands or gloves that contact raw poultry in the slaughter area of the plant?		
	1. Always before handling the next unit of product	17	9.7
	2. More than once per hour	32	14.4
	3. Once per hour	0	0.0
	4. One or more times per shift, but less than once per hour	128	55.4
	5. No specific routine frequency	38	18.5
	No response	4	1.9
	Total	219	100.0
1.3[b]	What is the routine frequency used by this plant for sanitizing hands or gloves that contact raw poultry in the deboning area of the plant?		
	1. Always before handling the next unit of product	6	3.7
	2. More than once per hour	14	7.0
	3. Once per hour	3	1.6
	4. One or more times per shift, but less than once per hour	143	64.2
	5. No specific routine frequency	35	18.4
	No response	10	5.1
	Total	211	100.0

(continued)

[a]Respondents could select multiple responses.

[b]Excludes respondents who wrote in "not applicable"; these respondents may not have deboning areas.

Table 6-1. Weighted Responses for Section 1 of the Poultry Slaughter and Processing Survey: Slaughter and Deboning (continued)

		n	%
1.4	To the best of your knowledge, what percentage of live birds slaughtered at this plant during the past year was imported?		
	1. None	208	94.8
	2. 1 to 9 percent	6	2.6
	3. 10 to 24 percent	0	0.0
	4. 25 to 49 percent	1	0.4
	5. 50 percent or more	0	0.0
	No response	4	2.2
	Total	219	100.0
1.5[a]	What was the total amount of raw product, not ground, primal cuts (HACCP Code 03C; e.g., whole birds, tray packed poultry, breaded cuts) produced by this plant during the past year?		
	Pounds of annual production (mean = 149,849,181)	196	—
	1. None	8	3.7
	2. 1 to 99,999 pounds	10	6.0
	3. 100,000 to 999,999 pounds	9	6.0
	4. 1,000,000 to 9,999,999 pounds	19	9.5
	5. 10,000,000 to 99,999,999 pounds	40	17.3
	6. 100,000,000 to 999,999,999 pounds	117	49.4
	7. 1,000,000,000 pounds or more	1	0.4
	No response	15	7.6
	Total	219	100.0

(continued)

[a]Respondents wrote in a number to answer this question. The mean is for nonzero responses. For reporting purposes, we grouped the responses into the categories shown.

Table 6-1. Weighted Responses for Section 1 of the Poultry Slaughter and Processing Survey: Slaughter and Deboning (continued)

			Use the technology now	Expect to begin using the technology within 1 to 3 years	Does not use and does not expect to use the technology within 1 to 3 years	No response/ multiple responses/ NA *(write in)*	Total
		n	%	%	%	%	%
1.6	For each technology listed below, please circle the response that applies for this plant.						
	a. Company-owned lab for microbiological testing	219	69.9	2.9	23.9	3.3	100.0
	b. Bioluminescent testing system	219	25.8	14.8	53.9	5.4	100.0
	c. Conveyor belts made from materials designed to prevent bacterial growth	219	28.4	17.3	49.9	4.4	100.0
	d. Inside-outside bird washers	219	85.1	1.1	10.7	3.1	100.0
	e. Organic acid rinse	219	21.9	13.4	61.0	3.7	100.0
	f. Metal detection equipment	219	58.6	4.4	33.7	3.3	100.0
	g. Automatic bird transfer (from kill line to evisceration line)	219	39.7	16.1	40.1	4.2	100.0

(continued)

Table 6-1. Weighted Responses for Section 1 of the Poultry Slaughter and Processing Survey: Slaughter and Deboning (continued)

			Use the practice now	Expect to begin using the practice within 1 to 3 years	Does not use and does not expect to use the practice within 1 to 3 years	No response	Total
		n	%	%	%	%	%
1.7	For each practice listed below, please circle the response that applies for this plant.						
	a. Requires and documents that its bird growers use stipulated production practices to control pathogens	219	60.7	7.5	25.9	5.9	100.0
	b. Requires and documents that its bird growers use stipulated production practices to control chemical residues (e.g., drugs)	219	77.3	3.5	12.8	6.3	100.0
	c. Rotates sanitizing chemicals it uses in the slaughter area on an annual basis or more frequently	219	56.1	11.3	28.4	4.2	100.0
	d. Uses chemical sanitizers for food contact hand tools used in the slaughter area *during operations*	219	71.5	6.1	18.6	3.7	100.0
	e. Uses sterilizer pots for heat sterilization of hand tools used in the slaughter area *during operations*	219	37.2	7.3	51.8	3.7	100.0
	f. Has written policies and procedures for recalling product	219	87.3	4.2	5.6	2.9	100.0
	g. Has written policies and procedures to protect against bioterrorism	219	66.5	17.3	13.0	3.3	100.0
	h. Has written policies and procedures to control the use of hazardous chemicals	219	88.6	2.2	5.4	3.8	100.0
	i. Has written policies and procedures for humane handling of birds	219	82.9	5.2	8.3	3.6	100.0
	j. Identifies and tracks its products, by production lot, backward to specific bird growers	219	78.7	4.3	13.5	3.6	100.0
	k. Identifies and tracks its products, by production lot, forward to specific buyers (not consumers) of its products	219	82.6	3.7	10.4	3.3	100.0
	l. Conducts fat pad sampling on a regular schedule	219	62.0	2.9	30.5	4.6	100.0

Table 6-2. Weighted Responses for Section 2 of the Poultry Slaughter and Processing Survey: Further Processing

		n	%
2.1[a]	Does this plant grind poultry or further process poultry products?		
	1. Yes	126	56.4
	2. No	93	43.6
	Total	219	100.0
2.2A[b]	What types of further processed food products does this plant produce?		
	1. Ready-to-eat (RTE) products for consumers	29	24.1
	2. Not-ready-to-eat (NRTE) products for consumers	111	87.4
	3. Products that are inputs to further processing by another plant	80	60.8
	No response	4	3.9
2.2B[c]	What types of further processed food products does this plant produce?		
	1. Only RTE products	2	2.0
	2. Only NRTE products	35	28.7
	3. Only products that are inputs to further processing	8	5.9
	4. RTE and NRTE products	5	4.7
	5. RTE products and inputs to further processing	1	0.8
	6. NRTE products and inputs to further processing	50	37.5
	7. RTE products, NRTE products, and inputs to further processing	21	16.6
	8. No response	4	3.9
	Total	126	100.0
2.3[d]	Thinking only about NRTE products for consumers that include cooking instructions on the label, for approximately how many of such products has the plant validated the cooking instructions?		
	1. This plant's NRTE products do not have cooking instructions	34	30.3
	2. None	10	9.2
	3. Less than half	7	6.5
	4. Half	2	1.7
	5. More than half	7	6.1
	6. All	49	44.1
	No response	2	2.2
	Total	111	100.0

(continued)

[a]Respondents who do not grind poultry or further process poultry products (n = 93) skipped to Question 3.1 and are not included in the results for Questions 2.2 through 2.14.

[b]Respondents could select multiple responses.

[c]Results are shown so that the responses sum to 100 percent.

[d]Excludes respondents who do not produce NRTE products.

Table 6-2. Weighted Responses for Section 2 of the Poultry Slaughter and Processing Survey: Further Processing (continued)

		n	%
2.4	For domestic products produced by this plant, approximately how many have a special statement or claim on the label to identify the origin of the animal from which the product was made?		
	1. None	89	68.7
	2. Less than half	11	9.1
	3. Half	1	0.7
	4. More than half	5	3.8
	5. All	16	13.7
	No response	4	3.9
	Total	126	100.0
2.5	For domestic products produced by this plant, approximately how many have a special statement or claim on the label to identify where (i.e., geographic location) the product was manufactured?		
	1. None	83	64.1
	2. Less than half	3	2.7
	3. Half	0	0.0
	4. More than half	4	3.0
	5. All	31	25.6
	No response	5	4.7
	Total	126	100.0
2.6	What percentage of raw poultry processed at this plant during the past year was received or purchased from another plant?		
	1. None	28	23.9
	2. 1 to 9 percent	51	39.0
	3. 10 to 24 percent	26	20.0
	4. 25 to 49 percent	12	9.9
	5. 50 percent or more	7	5.3
	No response	2	1.9
	Total	126	100.0
2.7	To the best of your knowledge, what percentage of raw poultry processed at this plant during the past year was imported as raw poultry?		
	1. None	118	93.1
	2. 1 to 9 percent	4	3.1
	3. 10 to 24 percent	0	0.0
	4. 25 to 49 percent	2	1.9
	5. 50 percent or more	0	0.0
	No response	2	1.9
	Total	126	100.0

(continued)

Table 6-2. Weighted Responses for Section 2 of the Poultry Slaughter and Processing Survey: Further Processing (continued)

		n	%
2.8[a]	Who conducts independent, third-party audits of this plant's further processing operations?		
	1. This plant's further processing operations are not audited by independent, third-party auditors	16	16.2
	2. Independent, third-party auditors that are hired by this plant or by corporate headquarters	85	64.1
	3. Customers of this plant	77	58.0
	4. Independent, third-party auditors that are hired by customers of this plant	73	54.7
	No response	2	1.9

(continued)

[a]Respondents could select multiple responses.

Table 6-2. Weighted Responses for Section 2 of the Poultry Slaughter and Processing Survey: Further Processing (continued)

		Use the practice now	Expect to begin using the practice within 1 to 3 years	Does not use and does not expect to use the practice within 1 to 3 years	No response/ NA *(write in)*	Total
	n	**%**	**%**	**%**	**%**	**%**
2.9	For each practice listed below, please circle the response that applies for this plant's further processing operations.					
a.	Requires and documents that suppliers who ship raw poultry to this plant for further processing use stipulated practices to control pathogens	97[a]	53.8	10.9	26.3	9.0	100.0
b.	Requires and documents that suppliers who ship raw poultry to this plant for further processing use stipulated practices to control chemical residues (e.g., drugs)	98[a]	58.5	11.5	23.6	6.4	100.0
c.	Treats its drains with sanitizers for pathogen control	126	61.2	5.3	27.4	6.1	100.0
d.	Uses chemical sanitizers for hand tools such as knives, spatulas, or tongs used in further processing areas *during operations*	126	65.8	7.0	21.5	5.7	100.0
e.	Rotates sanitizing chemicals it uses in the further processing area on an annual basis or more frequently	126	66.6	8.4	18.9	6.1	100.0
f.	Treats food contact equipment to remove biomatter *during operations*	126	64.5	6.9	23.6	4.9	100.0
g.	Uses antimicrobial treatment for food contact equipment *during operations*	126	56.0	6.9	32.2	4.9	100.0
h.	Has written policies and procedures for recalling further processed product	126	89.7	3.2	4.4	2.7	100.0

(continued)

[a]Excludes respondents who answered "not applicable" (i.e., do not receive raw poultry for further processing).

Table 6-2. Weighted Responses for Section 2 of the Poultry Slaughter and Processing Survey: Further Processing (continued)

			Use the technology now	Expect to begin using the technology within 1 to 3 years	Does not use and does not expect to use the technology within 1 to 3 years	No response/ NA *(write in)*	Total
		n	%	%	%	%	%
2.10	For each technology listed below, please circle the response that applies for this plant's further processing operations.						
	a. Conveyor belts made of materials designed to prevent bacterial growth	126	25.5	17.3	49.5	7.7	100.0
	b. Metal detection equipment	126	76.8	1.5	16.2	5.4	100.0
	c. Irradiation equipment	126	0.0	1.5	90.9	7.7	100.0
	d. High pressure processing	126	7.1	2.2	84.9	5.7	100.0
	e. Infrared technology	126	5.2	8.9	77.4	8.4	100.0
	f. Application of antimicrobial chemicals	126	47.3	8.9	38.0	5.7	100.0
	g. Other types of pasteurization	126	5.7	6.8	78.4	9.1	100.0

(continued)

Table 6-2. Weighted Responses for Section 2 of the Poultry Slaughter and Processing Survey: Further Processing (continued)

		n	Mean pounds of annual production[a]
2.11	For each HACCP product category listed below, provide your best estimate of the total pounds produced by this plant during the past year.		
	a. Raw, ground poultry (03B)	61	27,404,424
	b. Thermally processed, commercially sterile (03D)	1	*
	c. Not heat treated, shelf stable (03E)	2	*
	d. Heat treated, shelf stable (03F)	4	*
	e. Fully cooked, not shelf stable (03G)	25	28,243,349
	f. Heat treated, but not fully cooked, not shelf stable (03H)	17	44,824,762
	g. Secondary inhibitors, not shelf stable (03I)	3	*
	No response	53	—
		n	**%**
2.12	What is the routine frequency used by this plant for sanitizing hands or gloves that contact raw poultry in the further processing area of this plant?		
	1. Always before handling the next unit of product	6	5.0
	2. More than once per hour	7	5.8
	3. Once per hour	2	1.6
	4. One or more times per shift, but less than once per hour	90	68.7
	5. No specific routine frequency	19	17.0
	No response/not applicable *(write in)*	2	2.0
	Total	126	100.0
2.13[b]	What is the routine frequency used by this plant for sanitizing hands or gloves that contact RTE product?		
	1. Always before handling the next unit of product	5	17.8
	2. More than once per hour	9	29.6
	3. Once per hour	2	8.2
	4. One or more times per shift, but less than once per hour	11	34.4
	5. No specific routine frequency	2	9.9
	Total	29	100.0

(continued)

[a]Mean of nonzero responses.

[b]Excludes respondents who do not produce RTE product.

*The mean is suppressed because of the small number of respondents.

Table 6-2. Weighted Responses for Section 2 of the Poultry Slaughter and Processing Survey: Further Processing (continued)

		n	%
2.14[a]	What is the routine frequency used by this plant for sanitizing product handling equipment (such as spatulas, forks, and tongs) that contacts RTE product?		
	1. Always before handling the next unit of product	2	6.4
	2. More than once per hour	7	21.6
	3. Once per hour	1	3.3
	4. One or more times per shift, but less than once per hour	12	37.7
	5. Daily	2	8.2
	6. At the end of each production lot	2	9.9
	7. No specific routine frequency	3	13.0
	Total	29	100.0

[a]Excludes respondents who do not produce RTE product.

Table 6-3. Weighted Responses for Section 3 of the Poultry Slaughter and Processing Survey: Microbiological Testing Practices

		n	%
3.1[a]	In addition to the generic *E. coli* testing of carcasses required by FSIS regulation, does this plant conduct microbiological testing using either its own lab or an independent commercial lab?		
	1. Yes	193	85.2
	2. No	26	14.8
	Total	219	100.0
3.2A	Does this plant test carcasses prior to deboning?		
	1. Yes	168	86.2
	2. No	22	12.3
	No response	3	1.5
	Total	193	100.0
3.2B[b]	Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test carcasses prior to deboning?		
	1. Traditional cultural methods	122	72.7
	2. Enzyme linked immunoassay (ELISA)	59	34.0
	3. Polymerase chain reaction (PCR)	26	15.3
	4. Other rapid methods	35	20.2

(continued)

[a]Respondents who do not conduct microbiological testing (n = 26) skipped to Question 3.10 and are not included in the results for Questions 3.2 through 3.9.

[b]Excludes respondents who do not test carcasses prior to deboning. Respondents could select multiple responses.

Table 6-3. Weighted Responses for Section 3 of the Poultry Slaughter and Processing Survey: Microbiological Testing Practices (continued)

			Never	Less than once per month	Once per month	More than once per month	Once per week	More than once per week	Once per day	Once per shift	More than once per shift	No response/ multiple responses	Total
		n	%	%	%	%	%	%	%	%	%	%	%
3.3[a]	For each organism listed below, how frequently is microbiological testing done on carcasses prior to deboning?												
	a. Aerobic plate count (APC)	168	42.1	11.9	1.7	2.3	2.3	8.7	6.5	5.7	10.5	8.3	100.0
	b. Total plate count (TPC)	168	39.7	11.3	2.4	4.1	4.6	5.8	5.9	5.7	13.3	7.2	100.0
	c. Total coliforms	168	42.2	9.1	1.8	3.4	2.9	6.4	3.5	4.9	16.9	9.0	100.0
	d. *Salmonella* species	168	7.3	6.0	3.0	3.5	3.2	4.6	7.0	27.6	34.6	3.2	100.0
	e. *Salmonella* Enteritidis	168	69.3	5.4	0.6	1.7	1.2	0.6	1.8	1.1	7.1	11.2	100.0
	f. *Campylobacter jejuni*	168	65.9	8.5	2.3	0.0	2.3	2.3	2.3	2.9	3.0	10.7	100.0
	g. Generic *E. coli* (voluntary)	168	17.8	7.3	0.9	0.6	1.2	7.0	5.9	2.3	51.0	6.0	100.0
	h. *Staphylococcus aureus*	168	72.0	8.0	2.3	0.0	0.6	1.1	1.2	2.3	2.3	10.1	100.0
	i. *Listeria* species	168	70.0	9.7	2.7	1.2	0.0	1.8	1.7	0.6	2.3	10.1	100.0
	j. *Listeria monocytogenes*	168	65.4	13.7	3.2	0.6	1.7	1.2	1.2	0.6	2.3	10.1	100.0
	k. Yeasts and molds	168	78.7	6.5	0.0	1.2	0.6	0.0	0.0	0.6	2.4	10.1	100.0

(continued)

[a]Excludes respondents who do not test carcasses prior to deboning.

Table 6-3. Weighted Responses for Section 3 of the Poultry Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	%
3.4A	Does this plant test raw poultry after deboning (i.e., before processing?)		
	1. Yes	123	62.9
	2. No	65	34.6
	No response	5	2.5
	Total	193	100.0
3.4B[a]	Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test raw poultry after deboning (i.e., before processing)?		
	1. Traditional cultural methods	98	79.7
	2. Enzyme linked immunoassay (ELISA)	26	20.4
	3. Polymerase chain reaction (PCR)	8	6.3
	4. Other rapid methods	18	14.3

(continued)

[a]Excludes respondents who do not test raw poultry after deboning. Respondents could select multiple responses.

Table 6-3. Weighted Responses for Section 3 of the Poultry Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		Never	Less than once per month	Once per month	More than once per month	Once per week	More than once per week	Once per day	Once per shift	More than once per shift	No response	Total
	n	%	%	%	%	%	%	%	%	%	%	%
3.5[a] For each organism listed below, how frequently is microbiological testing done on raw poultry after deboning (i.e., before processing)?												
a. Aerobic plate count (APC)	123	28.4	6.0	4.7	2.3	4.4	15.7	6.4	5.5	21.3	5.2	100.0
b. Total plate count (TPC)	123	30.8	6.8	6.4	1.6	7.5	10.2	8.8	0.8	20.5	6.8	100.0
c. Total coliforms	123	38.9	8.4	6.0	1.6	5.1	10.1	6.4	3.1	12.0	8.4	100.0
d. *Salmonella* species	123	43.0	8.8	3.2	3.1	3.6	9.4	6.3	4.7	9.5	8.4	100.0
e. *Salmonella* Enteritidis	123	72.6	4.9	0.0	1.6	1.3	3.9	1.6	0.8	3.3	9.9	100.0
f. *Campylobacter jejuni*	123	74.3	5.2	0.0	0.8	2.8	0.8	1.6	0.8	2.5	11.2	100.0
g. Generic *E. coli*	123	36.6	8.0	5.6	2.3	4.4	11.7	4.8	4.7	13.5	8.4	100.0
h. *Staphylococcus aureus*	123	66.9	6.0	4.0	1.6	2.0	3.9	1.6	1.7	3.2	9.1	100.0
i. *Listeria* species	123	66.4	13.6	3.2	0.8	1.3	0.8	1.7	0.8	1.7	9.9	100.0
j. *Listeria monocytogenes*	123	64.1	14.4	2.3	1.6	2.8	1.6	1.7	0.8	1.7	9.1	100.0
k. Yeasts and molds	123	74.4	5.6	2.3	2.4	1.3	0.0	0.8	0.8	2.4	9.9	100.0

(continued)

[a]Excludes respondents who do not test raw poultry after deboning.

Table 6-3. Weighted Responses for Section 3 of the Poultry Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	%
3.6A[a]	Does this plant test ready-to-eat (RTE) finished product?		
	1. Yes	29	95.1
	2. No	1	4.9
	Total	30	100.0
3.6B[b]	Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test RTE finished product?		
	1. Traditional cultural methods	25	86.9
	2. Enzyme linked immunoassay (ELISA)	12	38.4
	3. Polymerase chain reaction (PCR)	10	31.9
	4. Other rapid methods	10	32.3

(continued)

[a]Excludes respondents who do not produce RTE finished product (based on response to Question 3.6).

[b]Excludes respondents who do not produce RTE finished product or do not test RTE finished product. Respondents could select multiple responses.

Table 6-3. Weighted Responses for Section 3 of the Poultry Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		Never	Less than once per month	Once per month	More than once per month	Once per week	More than once per week	Once per day	Once per shift	More than once per shift	No response	Total
	n	%	%	%	%	%	%	%	%	%	%	%
3.7[a] For each organism listed below, how frequently is microbiological testing done on RTE finished product?												
a. Aerobic plate count (APC)	29	25.3	0.0	6.4	9.8	6.4	6.4	6.6	0.0	32.5	6.8	100.0
b. Total plate count (TPC)	29	22.1	0.0	6.4	6.6	9.6	6.4	6.6	0.0	35.6	6.8	100.0
c. Total coliforms	29	28.5	0.0	9.8	6.6	3.2	6.4	6.6	0.0	32.3	6.8	100.0
d. *Salmonella* species	29	16.8	14.7	12.7	12.9	3.2	9.8	6.8	0.0	19.7	3.4	100.0
e. *Salmonella* Enteritidis	29	61.8	8.3	3.4	3.2	0.0	6.6	0.0	0.0	10.0	6.8	100.0
f. *Campylobacter jejuni*	29	78.3	8.3	0.0	0.0	0.0	3.2	3.4	0.0	3.4	3.4	100.0
g. Generic *E. coli*	29	31.5	0.0	6.6	3.2	3.2	6.6	10.0	0.0	35.6	3.4	100.0
h. *Staphylococcus aureus*	29	31.9	9.6	6.4	0.0	3.2	3.2	3.4	0.0	35.6	6.8	100.0
i. *Listeria* species	29	29.3	19.8	11.5	3.2	3.4	9.8	3.4	3.4	12.9	3.4	100.0
j. *Listeria monocytogenes*	29	31.0	14.9	16.1	9.6	3.4	3.4	0.0	0.0	9.8	11.9	100.0
k. Yeasts and molds	29	57.6	9.8	6.4	0.0	3.2	6.6	0.0	3.2	6.6	6.8	100.0
l. *C. perfringens*	29	67.3	22.5	0.0	0.0	0.0	0.0	0.0	0.0	3.4	6.8	100.0

(continued)

[a]Excludes respondents who do not produce RTE finished product or do not test RTE finished product.

Table 6-3. Weighted Responses for Section 3 of the Poultry Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	%
3.8A[a]	Does this plant test not-ready-to-eat (NRTE) finished product?		
	1. Yes	117	79.0
	2. No	22	15.4
	No response	8	5.6
	Total	147	100.0
3.8B[b]	Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test NRTE finished product?		
	1. Traditional cultural methods	95	81.1
	2. Enzyme linked immunoassay (ELISA)	36	29.9
	3. Polymerase chain reaction (PCR)	13	11.4
	4. Other rapid methods	25	20.8

(continued)

[a]Excludes respondents who do not produce NRTE finished product (based on the response to Question 3.8).

[b]Excludes respondents who do not produce NRTE finished product or do not test NRTE finished product. Respondents could select multiple responses.

Table 6-3. Weighted Responses for Section 3 of the Poultry Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		Never	Less than once per month	Once per month	More than once per month	Once per week	More than once per week	Once per day	Once per shift	More than once per shift	No response /multiple responses	Total
	n	%	%	%	%	%	%	%	%	%	%	%
3.9[a] For each organism listed below, how frequently is microbiological testing done on NRTE finished product?												
a. Aerobic plate count (APC)	117	22.4	10.7	5.0	2.5	6.3	9.9	6.8	5.8	23.0	7.6	100.0
b. Total plate count (TPC)	117	23.2	10.6	5.0	4.1	7.2	6.6	6.8	4.1	22.3	10.1	100.0
c. Total coliforms	117	28.0	9.8	5.0	2.5	7.2	5.7	9.3	5.8	18.3	8.5	100.0
d. *Salmonella* species	117	28.8	10.5	3.4	4.1	4.6	6.6	6.8	13.3	14.2	7.7	100.0
e. *Salmonella* Enteritidis	117	68.3	5.2	0.0	1.7	1.3	3.3	1.7	1.6	4.2	12.6	100.0
f. *Campylobacter jejuni*	117	75.5	4.7	1.6	0.8	3.0	0.0	0.9	0.8	0.8	11.8	100.0
g. Generic *E. coli*	117	19.1	7.7	2.5	1.6	6.3	9.9	5.9	8.3	32.6	6.0	100.0
h. *Staphylococcus aureus*	117	63.0	6.5	2.5	2.5	4.7	2.5	0.9	0.8	4.9	11.8	100.0
i. Yeasts and molds	117	71.8	5.9	1.6	1.7	2.2	0.0	0.9	0.8	3.3	11.8	100.0

(continued)

[a]Excludes respondents who do not produce NRTE finished product or do not test NRTE finished product.

Table 6-3. Weighted Responses for Section 3 of the Poultry Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	%
3.10A	Does this plant conduct environmental sampling?		
	1. Yes	173	75.2
	2. No	44	24.0
	No response	2	0.8
	Total	219	100.0
3.10B[a]	What methods does this plant use to test environmental samples?		
	1. Traditional cultural methods	128	73.7
	2. Adenosine trisodium phosphate (ATP) bioluminescence	33	18.7
	3. Enzyme linked immunoassay (ELISA)	14	7.8
	4. Polymerase chain reaction (PCR)	9	5.0
	5. Other rapid methods	34	19.3

(continued)

[a]Excludes respondents who do not conduct environmental sampling. Respondents could select multiple responses.

Table 6-3. Weighted Responses for Section 3 of the Poultry Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	Never	Less than once per month	Once per month	More than once per month	Once per week	More than once per week	Once per day	Once per shift	More than once per shift	No specific routine frequency	No response	Total
			%	%	%	%	%	%	%	%	%	%	%	%
3.11[a]	How frequently is environmental sampling done for each RTE area listed below?													
	a. Equipment surfaces that come into direct contact with RTE product	28	0.0	19.1	8.4	0.0	42.7	3.2	19.6	3.4	0.0	0.0	3.4	100.0
	b. Equipment surfaces that do not come into direct contact with RTE product	28	8.4	19.1	0.0	0.0	42.7	3.2	19.6	0.0	0.0	3.4	3.4	100.0
	c. Walls	28	11.9	22.5	6.7	0.0	32.6	9.7	6.7	0.0	0.0	6.5	3.4	100.0
	d. Overhead structures	28	11.9	19.1	6.7	0.0	32.6	9.7	6.7	0.0	0.0	9.9	3.4	100.0
	e. Drains	28	11.9	25.8	3.4	0.0	29.4	6.5	9.9	0.0	0.0	9.7	3.4	100.0
3.12[b]	How frequently is environmental sampling done for each NRTE area listed below?													
	a. Equipment surfaces that come into direct contact with NRTE product	100	8.5	5.2	2.0	0.0	20.7	9.8	44.1	4.8	1.9	1.0	2.0	100.0
	b. Equipment surfaces that do not come into direct contact with NRTE product	100	38.2	10.5	6.0	1.0	12.9	4.8	18.7	1.9	0.0	4.9	1.0	100.0
	c. Walls	100	59.9	11.5	7.0	3.0	7.8	3.9	3.0	0.0	0.0	2.9	1.0	100.0
	d. Overhead structures	100	55.0	9.6	9.0	3.0	7.8	6.8	3.9	0.0	0.0	3.9	1.0	100.0
	e. Drains	100	65.7	8.6	7.9	1.0	7.9	2.9	2.0	0.0	0.0	2.9	1.0	100.0

(continued)

[a]Excludes respondents who do not conduct environmental sampling and do not produce RTE finished product (based on response to Question 3.6).
[b]Excludes respondents who do not conduct environmental sampling and do not produce NRTE finished product (based on response to Question 3.8).

Table 6-3. Weighted Responses for Section 3 of the Poultry Slaughter and Processing Survey: Microbiological Testing Practices (continued)

		n	%
3.13[a]	How frequently does this plant's environmental sampling include testing for *Listeria* species?		
	1. Never	114	64.8
	2. Less than once per month	6	4.4
	3. Once per month	7	4.4
	4. More than once per month	1	0.6
	5. Once per week	16	9.0
	6. More than once per week	6	3.4
	7. Once per day	7	4.0
	8. Once per shift	1	0.6
	9. More than once per shift	0	0.0
	10. No specific routine frequency	4	2.6
	No response	11	6.3
	Total	173	100.0

[a]Excludes respondents who do not conduct environmental sampling.

Table 6-4. Weighted Responses for Section 4 of the Poultry Slaughter and Processing Survey: Employee Training

		n	%
4.1[a]	What food safety training is provided for newly hired production employees of this plant?		
	1. No food safety training for new hires	4	2.5
	2. Written food safety training materials are given to new hires	158	68.0
	3. Informal, unscheduled on-the-job food safety training	125	58.3
	4. Scheduled on-the-job food safety training conducted by plant personnel	119	51.2
	5. Formal food safety course conducted by plant personnel	69	29.8
	6. Formal food safety course conducted by professional trainers	15	6.3
4.2[a]	What continuing food safety training is provided for production employees of this plant?		
	1. No continuing food safety training for employees	8	4.6
	2. Written refresher materials given to employees	89	37.9
	3. Continuing informal on-the-job food safety training	157	72.2
	4. Scheduled on-the-job refresher food safety training conducted by plant personnel	99	42.2
	5. Formal, periodic refresher course work conducted by plant personnel	71	30.7
	6. Formal, periodic refresher course work conducted by professional trainers	35	14.8
4.3	Approximately how many production employees currently working at this plant have completed formal HACCP training (for example, a 3 to 5 day course)?		
	1. None	10	5.3
	2. 1 to 3 employees	60	30.6
	3. 4 to 9 employees	55	24.2
	4. 10 to 20 employees	46	19.8
	5. More than 20 employees	45	19.0
	No response	3	1.3
	Total	219	100.0

[a]Respondents could select multiple responses.

Table 6-5. Weighted Responses for Section 5 of the Poultry Slaughter and Processing Survey: Plant Characteristics

		n	%
5.1[a]	In what calendar year was this plant built? If recently renovated, provide the year for the renovation.		
	Year (mean response= 1987)	216	—
	1. Before 1960	27	12.4
	2. 1960–1969	14	6.2
	3. 1970–1979	14	6.3
	4. 1980–1989	25	11.9
	5. 1990–1999	82	36.8
	6. After 1999	54	24.7
	No response	3	1.8
	Total	219	100.0
5.2[a]	What is the approximate total square footage of the production space for this plant?		
	Square footage (mean response = 111,586)	205	—
	1. Under 1,000 sq. ft.	6	4.0
	2. 1,000 – 9,999	16	10.1
	3. 10,000 – 99,999	85	37.9
	4. 100,000 – 999,999	98	41.3
	5. 1,000,000 or more sq. ft.	0	0.0
	No response	14	6.7
	Total	219	100.0
		n	**Mean**
5.3	Calculated as a percentage of total square footage given in Question 5.2, what is the approximate percentage of the square footage of the production space of this plant that is under 5 years old, 5 years to just under 20 years old, or 20 year old or more?		
	1. Under 5 years old		13.1%
	2. 5 years to just under 20 years old		40.4%
	3. 20 years old or more		46.5%
	Total	201[b]	100.0%
	No response	18	—

(continued)

[a]Respondents wrote in a number to answer this question. For reporting purposes, we grouped the responses into the categories shown.

[b]Respondents' answers were excluded from the analysis if the sum of their responses was less than 80 percent or greater than 120 percent (n = 2).

Table 6-5. Weighted Responses for Section 5 of the Poultry Slaughter and Processing Survey: Plant Characteristics (continued)

		n	%
5.4	How many slaughter and evisceration shifts does this plant operate daily?		
	1. This plant does not operate on a daily basis	20	13.2
	2. One	62	29.1
	3. Two	134	56.5
	4. Three	3	1.3
	Total	219	100.0
5.5	How many deboning shifts does this plant operate daily?		
	1. None	52	24.3
	2. Deboning shift is not operated on a daily basis	17	11.0
	3. One	43	19.7
	4. Two	106	44.7
	5. Three	0	0.0
	No response	1	0.4
	Total	219	100.0
5.6	How many further processing shifts does this plant operate daily?		
	1. None	81	37.6
	2. Further processing shift is not operated on a daily basis	13	7.8
	3. One	29	14.1
	4. Two	91	38.3
	5. Three	1	0.4
	No response	4	1.7
	Total	219	100.0
5.7	How many clean up shifts does this plant operate daily? This includes cleanups conducted by production and processing personnel, sanitation crews, and contractors.		
	1. None	3	1.8
	2. Clean up shift is not operated on a daily basis	10	6.7
	3. One	162	71.4
	4. Two	26	12.5
	5. Three	18	7.6
	Total	219	100.0

(continued)

Table 6-5. Weighted Responses for Section 5 of the Poultry Slaughter and Processing Survey: Plant Characteristics (continued)

		n	%
5.8[a]	Approximately how many people are employed at this plant?		
	Full-time equivalents (mean response = 645)	215	—
	1. Fewer than 10	18	12.1
	2. Between 10 and 499	68	31.4
	3. 500 or more	129	54.3
	No response	4	2.2
	Total	219	100.0
5.9	Does this plant have a person on staff whose primary responsibility is to manage food safety activities at the plant (i.e., food safety manager)?		
	1. Yes	166	73.5
	2. No	51	25.6
	No response	2	0.8
	Total	219	100.0
5.10[b]	Approximately what percentage of this plant's food safety manager's time is devoted to managing food safety activities at the plant?		
	1. 1 to 24 percent	19	13.2
	2. 25 to 49 percent	21	12.2
	3. 50 to 74 percent	42	24.5
	4. 75 to 99 percent	40	23.1
	5. 100 percent	42	25.5
	No response	2	1.5
	Total	166	100.0
5.11	Does this plant have a quality control/quality assurance department?		
	1. Yes	200	87.9
	2. No	18	11.4
	No response	1	0.7
	Total	219	100.0

(continued)

[a]Respondents wrote in a number to answer this question. For reporting purposes, we grouped the responses into the categories shown.

[b]Excludes respondents who do not have a food safety manager.

Table 6-5. Weighted Responses for Section 5 of the Poultry Slaughter and Processing Survey: Plant Characteristics (continued)

		n	%
5.12[a]	Approximately how many employees at this plant work in the plant's quality control/quality assurance department?		
	Full-time equivalents (mean response = 18)	194	—
	1. Fewer than 5	38	22.0
	2. Between 6 and 25	110	53.2
	3. Between 26 and 50	39	18.6
	4. 51 or more	7	3.3
	No response	6	2.9
	Total	200	100.0
5.13	How many USDA or state inspected plants are owned by the company that owns this plant?		
	1. 1	58	31.5
	2. 2 to 5	44	18.9
	3. 6 to 20	52	22.0
	4. 21 or more	62	26.2
	No response	3	1.5
	Total	219	100.0
5.14	What was the approximate value of total plant sales revenue for the most recently completed fiscal year?		
	1. Under $2.5 million	26	16.5
	2. $2.5 million to $24.9 million	29	13.2
	3. $25 million to $49.9 million	15	6.5
	4. $50 million to $99.9 million	30	12.9
	5. $100 million to $249.9 million	63	26.5
	6. $250 million to $499.9 million	24	10.0
	7. $500 million to $999.9 million	2	0.8
	8. $1 billion or more	3	1.3
	No response	27	12.2
	Total	219	100.0

[a]Excludes respondents who do not have a QC/QA department. Respondents wrote in a number to answer this question. For reporting purposes, we grouped the responses into the categories shown.

Table 6-6. Percentage of Poultry Slaughter and Processing Plants that Routinely Sanitize Hands or Gloves, by HACCP Size

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Routine frequency after contact with raw poultry in slaughter area	(n = 27)			(n = 64)			(n = 128)			(n = 219)		
Always before handling next unit of product	37.0	23.8	52.6	4.7	2.5	8.6	3.1	2.1	4.6	9.7	7.2	13.0
More than once per hour	11.1	4.5	24.8	18.7	14.0	24.7	13.3	11.0	15.9	14.4	12.0	17.3
Once per hour	0.0	0.0	0.0	0.0	0.0	0.0	0.0.	0.0	0.0	0.0	0.0	0.0
One or more times per shift but less than once per hour	14.8	6.9	29.1	56.2	49.4	62.9	68.8	65.3	72.0	55.4	52.1	58.7
No specific routine frequency	33.3	20.7	48.9	20.3	15.4	26.4	12.5	10.3	15.1	18.5	15.4	22.0
No response	3.7	0.8	16.2	0.0	0.0	0.0	2.3	1.5	3.7	1.9	1.0	3.6
Total	100.0			100.0			100.0			100.0		
Routine frequency after contact with raw poultry in deboning area[a]	(n = 27)			(n = 59)			(n = 125)			(n = 211)		
Always before handling next unit of product	14.8	6.9	29.1	1.7	0.5	5.4	0.8	0.3	1.9	3.7	2.0	6.5
More than once per hour	11.1	4.5	24.8	8.5	5.0	13.9	4.8	3.4	6.7	7.0	5.0	9.7
Once per hour	3.7	0.8	16.3	1.7	0.5	5.4	0.8	0.3	1.9	1.6	0.7	3.5
One or more times per shift but less than once per hour	18.5	9.4	33.3	66.1	58.4	73.0	79.2	75.9	82.1	64.2	60.7	67.6
No specific routine frequency	40.7	27.0	56.2	20.3	14.8	27.3	9.6	7.6	12.1	18.4	15.1	22.1
No response	11.1	4.5	24.8	1.7	0.5	5.4	4.8	3.4	6.7	5.1	3.4	7.7
Total	100.0			100.0			100.0					

(continued)

[a]Excludes respondents who wrote in "not applicable," these respondents may not have deboning areas.

Table 6-6. Percentage of Poultry Slaughter and Processing Plants that Routinely Sanitize Hands or Gloves, by HACCP Size (continued)

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Routine frequency after contact with raw poultry in further processing area	(n = 12)			(n = 26)			(n = 88)			(n = 126)		
Always before handling next unit of product	8.3	1.3	39.5	7.7	2.3	22.7	3.4	1.6	7.1	5.0	2.6	9.5
More than once per hour	8.3	1.3	39.5	11.5	4.4	27.1	3.4	1.6	7.1	5.8	3.1	10.4
Once per hour	0.0	0.0	0.0	7.7	2.3	22.7	0.0	0.0	0.0	1.6	0.5	5.0
One or more times per shift but less than once per hour	25.0	8.7	54.0	53.8	37.3	69.6	83.0	77.1	87.6	68.7	62.5	74.3
No specific routine frequency	50.0	25.2	74.8	15.4	6.7	31.5	10.2	6.7	15.3	17.0	12.3	23.0
No response	8.3	1.3	39.5	3.8	0.7	18.6	0.0	0.0	0.0	2.0	0.5	6.9
Total	100.0			100.0			100.0			100.0		
Routine frequency after contact with RTE product (for plants that produce RTE product)	(n = 5)			(n = 7)			(n = 17)			(n = 29)		
Always before handling next unit of product	*			42.9	12.8	79.3	5.9	0.8	32.9	17.8	7.4	37.2
More than once per hour	*			0.0	0.0	0.0	47.1	25.2	70.1	29.6	16.3	47.6
Once per hour	*			14.3	1.6	62.6	0.0	0.0	0.0	8.2	1.9	29.8
One or more times per shift but less than once per hour	*			42.9	12.8	79.3	47.1	25.2	70.1	34.4	20.8	51.2
No specific routine frequency	*			0.0	0.0	0.0	0.0	0.0	0.0	9.9	2.8	29.7
Total				100.0			100.0			100.0		

*The results are suppressed because of the small number of respondents.

Table 6-7. Percentage of Poultry Slaughter and Processing Plants Currently Using the Technology, by HACCP Size

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Technologies for slaughter and deboning	(n = 27)			(n = 64)			(n = 128)			(n = 219)		
Company-owned lab for microbiological testing	3.7	0.8	16.2	65.6	58.9	71.8	94.5	92.6	96.0	69.9	67.5	72.1
Bioluminescent testing system	0.0	0.0	0.0	20.3	15.4	26.4	37.5	34.1	41.0	25.8	23.5	28.3
Conveyor belts made from materials designed to prevent bacterial growth	3.7	0.8	16.2	34.4	28.2	41.1	33.6	30.3	37.1	28.4	25.7	31.3
Inside-outside bird washers	29.6	17.7	45.1	95.3	91.4	97.5	98.4	97.2	99.1	85.1	82.2	87.6
Organic acid rinse	3.7	0.8	16.2	21.9	16.7	28.1	28.1	25.0	31.5	21.9	19.4	24.6
Metal detection equipment	3.7	0.8	16.2	42.2	35.6	49.1	85.9	83.2	88.3	58.6	56.0	61.1
Automatic bird transfer (from kill line to evisceration line)	0.0	0.0	0.0	23.4	18.1	29.7	61.7	58.2	65.1	39.7	37.2	42.2
Technologies for further processing operations	(n = 12)			(n = 26)			(n = 88)			(n = 126)		
Conveyor belts made from materials designed to prevent bacterial growth	0.0	0.0	0.0	26.9	14.7	44.0	30.7	24.7	37.4	25.5	20.7	31.0
Metal detection equipment	8.3	1.3	39.5	61.5	44.5	76.1	96.6	92.9	98.4	76.8	72.2	80.8
Irradiation equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
High pressure processing	8.3	1.3	39.5	0.0	0.0	0.0	9.1	5.8	14.0	7.1	4.4	11.3
Infrared technology	0.0	0.0	0.0	3.8	0.7	18.6	6.8	4.0	11.3	5.2	3.1	8.6
Application of antimicrobial chemicals	41.7	19.1	68.3	46.2	30.4	62.7	48.9	42.0	55.8	47.3	40.5	54.1
Other types of pasteurization	8.3	1.3	39.5	7.7	2.3	22.7	4.5	2.4	8.5	5.7	3.1	10.2

Table 6-8. Percentage of Poultry Slaughter and Processing Plants Currently Using the Pathogen-Control Practice, by HACCP Size

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Practices for slaughter and deboning	(n = 27)			(n = 64)			(n = 128)			(n = 219)		
Requires and documents that its bird growers use stipulated production practices to control pathogens	37.0	23.8	52.6	57.8	50.9	64.4	70.3	66.9	73.5	60.7	56.9	64.4
Requires and documents that its bird growers use stipulated production practices to control chemical residues (e.g., drugs)	44.4	30.2	59.7	71.9	65.3	77.6	91.4	89.2	93.2	77.3	73.7	80.6
Rotates sanitizing chemicals it uses in the slaughter area on an annual basis or more frequently	29.6	17.7	45.1	62.5	55.7	68.9	61.7	58.2	65.1	56.1	52.4	59.7
Uses chemical sanitizers for food contact hand tools used in the slaughter area during operations	59.3	43.9	73.0	62.5	55.7	68.9	80.5	77.5	83.2	71.5	67.7	75.0
Uses sterilizer pots for heat sterilization of hand tools used in the slaughter area during operations	14.8	6.9	29.1	39.1	32.6	45.9	43.8	40.2	47.3	37.2	33.9	40.6
Has written policies and procedures for recalling product	44.4	30.2	59.7	90.6	85.8	93.9	100.0	100.0	100.0	87.3	84.0	90.0
Has written policies and procedures to protect against bioterrorism	18.5	9.4	33.3	51.6	44.7	58.3	90.6	88.3	92.5	66.5	63.3	69.5
Has written policies and procedures to control the use of hazardous chemicals	51.9	36.9	66.5	92.2	87.6	95.2	99.2	98.3	99.7	88.6	85.3	91.3
Has written policies and procedures for humane handling of birds	51.9	36.9	66.5	76.6	70.3	81.9	96.9	95.4	97.9	82.9	79.4	86.0

(continued)

Table 6-8. Percentage of Poultry Slaughter and Processing Plants Currently Using the Pathogen-Control Practice, by HACCP Size (continued)

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Identifies and tracks its products, by production lot, backward to specific bird growers	55.6	40.3	69.8	79.7	73.6	84.6	85.9	83.2	88.3	78.7	75.0	81.9
Identifies and tracks its products, by production lot, forward to specific buyers (not consumers) of its products	51.9	36.9	66.5	79.7	73.6	84.6	94.5	92.6	96.0	82.6	79.0	85.6
Conducts fat pad sampling on a regular schedule	3.7	0.8	16.2	46.9	40.1	53.7	89.8	87.5	91.8	62.0	59.5	64.5
Practices for further processing operations	(n = 12)			(n = 26)			(n = 88)			(n = 126)		
Requires and documents that raw poultry suppliers use stipulated practices to control pathogens[a]	37.5	12.2	72.1	50.0	28.3	71.7	57.5	49.0	65.6	53.8	45.5	61.9
Requires and documents that raw poultry suppliers use stipulated practices to control chemical residues (e.g., drugs)[a]	25.0	6.1	63.1	50.0	28.3	71.7	66.2	57.9	73.6	58.5	50.5	66.0
Treats its drains with sanitizers for pathogen control	58.3	31.7	80.9	80.8	64.2	90.8	55.7	48.7	62.4	61.2	54.5	67.5
Uses chemical sanitizers for hand tools such as knives, spatulas, or tongs used in further processing areas during operations	66.7	38.6	86.4	57.7	40.9	72.9	68.2	61.4	74.3	65.8	59.0	72.0
Rotates sanitizing chemicals it uses in the further processing area on an annual basis or more frequently	50.0	25.2	74.8	73.1	56.0	85.3	68.2	61.4	74.3	66.6	59.8	72.7

(continued)

[a]Excludes respondents who answered "not applicable" (i.e., do not receive raw poultry for further processing).

Table 6-8. Percentage of Poultry Slaughter and Processing Plants Currently Using the Pathogen-Control Practice, by HACCP Size (continued)

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Treats food contact equipment to remove biomatter during operations	58.3	31.7	80.9	50.0	33.8	66.2	70.5	63.8	76.4	64.5	57.7	70.8
Uses antimicrobial treatment for food contact equipment during operations	50.0	25.2	74.8	53.8	37.3	69.6	58.0	51.0	64.6	56.0	49.1	62.7
Has written policies and procedures for recalling further processed product	50.0	25.2	74.8	88.5	72.9	95.6	98.9	95.9	99.7	89.7	84.2	93.5

Table 6-9. Percentage of Poultry Slaughter and Processing Plants with Microbiological Testing Practices, by HACCP Size

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Conducts microbiological testing		(n = 27)			(n = 64)			(n = 128)			(n = 219)	
Conducts voluntary microbiological testing	44.4	30.2	59.7	92.2	87.6	95.2	95.3	93.5	96.6	85.2	81.9	88.0
Testing practices for carcasses		(n = 12)			(n = 59)			(n = 122)			(n = 193)	
Tests carcasses prior to deboning	66.7	38.7	86.4	78.0	70.9	83.7	93.4	91.1	95.2	86.2	82.5	89.2
Methods of testing used[a]		(n = 8)			(n = 46)			(n = 114)			(n = 168)	
Traditional cultural methods	75.0	37.1	93.8	71.7	61.5	80.1	72.8	68.4	76.8	72.7	68.1	76.8
Enzyme linked immunoassay (ELISA)	0.0	0.0	0.0	26.1	—	—	41.2	—	—	34.0	—	—
Polymerase chain reaction (PCR)	12.5	1.7	54.5	8.7	4.4	16.6	18.4	15.0	22.4	15.3	12.2	18.9
Other rapid methods	0.0	0.0	0.0	17.4	10.8	26.7	23.7	19.9	27.9	20.2	17.0	23.8
Testing practices for raw poultry		(n = 12)			(n = 59)			(n = 122)			(n = 193)	
Tests raw poultry after deboning (i.e., before processing)	50.0	25.2	74.8	45.8	38.2	53.5	73.8	70.0	77.2	62.9	58.7	66.9
Methods of testing used[a]		(n = 6)			(n = 27)			(n = 90)			(n = 123)	
Traditional cultural methods	*			70.4	53.7	82.9	82.2	76.5	86.8	79.7	73.6	84.6
ELISA	*			11.1	4.2	26.1	25.6	20.1	31.9	20.4	16.1	25.5
PCR	*			7.4	2.2	21.8	6.7	4.0	10.9	6.3	3.9	10.1
Other rapid methods	*			22.2	11.5	38.5	13.3	9.4	18.6	14.3	10.4	19.3

(continued)

[a]Respondents could select multiple responses.

Note: "—" indicates that the confidence interval could not be estimated because there was only one observation (respondent) in a stratum for that question.

*Results are suppressed because of the small number of respondents.

Table 6-9. Percentage of Poultry Slaughter and Processing Plants with Microbiological Testing Practices, by HACCP Size (continued)

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Testing practices for ready-to-eat (RTE) finished products (for plants that produce RTE product)		(n = 4)			(n = 9)			(n = 17)			(n = 30)	
Tests RTE finished products	*			100.0	100.0	100.0	100.0	100.0	100.0	95.1	70.6	99.4
Methods of testing used[a]		(n = 3)			(n = 9)			(n = 17)			(n = 29)	
Traditional cultural methods	*			77.8	39.9	94.8	88.2	62.5	97.1	86.9	69.5	95.0
ELISA	*			11.1	—	—	64.7	—	—	38.4	—	—
PCR	*			0.0	0.0	0.0	58.8	—	—	31.9	—	—
Other rapid methods	*			22.2	—	—	47.1	—	—	32.3	—	—
Testing practices for not-ready-to-eat (NRTE) finished products (for plants that produce NRTE product)		(n = 8)			(n = 41)			(n = 98)			(n = 147)	
Tests NRTE finished product	62.5	28.0	87.7	78.0	67.0	86.2	81.6	76.5	85.9	79.0	73.7	83.5
Methods of testing used[a]		(n = 5)			(n = 32)			(n = 80)			(n = 117)	
Traditional cultural methods	*			78.1	64.1	87.7	82.5	75.8	87.6	81.1	74.8	86.1
ELISA	*			21.9	12.3	35.9	36.2	29.2	44.0	29.9	24.3	36.1
PCR	*			15.6	7.7	29.0	8.8	5.3	14.2	11.4	7.4	17.1
Other rapid methods	*			18.7	10.0	32.5	23.8	17.8	30.9	20.8	16.0	26.6

(continued)

[a]Respondents could select multiple responses.

Note: "—" indicates that the confidence interval could not be estimated because there was only one observation (respondent) in a stratum for that question.

*Results are suppressed because of the small number of respondents.

Table 6-9. Percentage of Poultry Slaughter and Processing Plants with Microbiological Testing Practices, by HACCP Size (continued)

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Testing practices for environmental sampling	(n = 27)			(n = 64)			(n = 128)			(n = 219)		
Conducts environmental sampling	22.2	12.0	37.3	84.4	78.7	88.7	88.3	85.8	90.4	75.2	72.1	78.0
Methods of testing used[a]	(n = 6)			(n = 54)			(n = 113)			(n = 173)		
Traditional cultural methods	*			64.8	56.1	72.6	78.8	74.6	82.4	73.7	69.3	77.7
Adenosine trisodium phosphate (ATP) bioluminescence	*			18.5	12.7	26.3	20.4	16.8	24.5	18.7	15.6	22.1
ELISA	*			3.7	1.5	8.8	10.6	8.0	14.0	7.8	6.0	10.3
PCR	*			0.0	0.0	0.0	8.0	5.7	11.0	5.0	3.6	6.9
Other rapid methods	*			22.2	15.8	30.3	19.5	15.9	23.6	19.3	16.2	22.8
Tests for *Listeria* species once per week or more often	*			13.0	8.1	20.0	20.4	16.8	24.5	16.9	14.1	20.2
Conducts environmental sampling of RTE area once per week or more often (for plants that produce RTE product)	(n = 4)			(n = 7)			(n = 17)			(n = 28)		
Equipment surfaces that come into direct contact with RTE product	*			71.4	—	—	94.1	—	—	69.0	—	—
Equipment surfaces that do *not* come into direct contact with RTE product	*			57.1	—	—	94.1	—	—	65.6	—	—
Walls	*			28.6	—	—	76.5	—	—	49.0	—	—
Overhead structures	*			28.6	—	—	76.5	—	—	49.0	—	—
Drains	*			28.6	—	—	70.6	—	—	45.8	—	—

(continued)

[a]Respondents could select multiple responses.

Note: "—" indicates that the confidence interval could not be estimated because there was only one observation (respondent) in a stratum for that question.

*Results are suppressed because of the small number of respondents.

Table 6-9. Percentage of Poultry Slaughter and Processing Plants with Microbiological Testing Practices, by HACCP Size (continued)

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Conducts environmental sampling of NRTE area once per week or more often (for plants that produce NRTE product)	(n = 3)			(n = 22)			(n = 75)			(n = 100)		
Equipment surfaces that come into direct contact with NRTE product	*			72.7	—	—	89.3	—	—	81.4	—	—
Equipment surfaces that do *not* come into direct contact with NRTE product	*			45.5	28.1	64.0	38.7	31.0	47.0	38.4	31.5	45.8
Walls	*			13.6	5.0	32.2	16.0	10.8	23.0	14.7	10.2	20.8
Overhead structures	*			9.1	2.6	27.1	22.7	16.5	30.3	18.5	13.6	24.8
Drains	*			13.6	5.0	32.2	13.3	8.6	20.0	12.8	8.5	18.7

Note: "—" indicates that the confidence interval could not be estimated because there was only one observation (respondent) in a stratum for that question.

*Results are suppressed because of the small number of respondents.

Table 6-10. Percentage of Poultry Slaughter and Processing Plants with Training for Production Employees, by HACCP Size

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Food safety training for newly hired employees[a]	(n = 27)			(n = 64)			(n = 128)			(n = 219)		
No training for new hires	11.1	4.5	24.8	1.6	0.5	4.6	0.0	0.0	0.0	2.5	1.2	5.1
Written food safety training materials are given to new hires	11.1	4.5	24.8	73.4	67.0	79.0	84.4	81.6	86.8	68.0	65.1	70.7
Informal, unscheduled on-the-job food safety training	74.1	58.7	85.2	57.8	50.9	64.4	53.1	49.5	56.7	58.3	54.6	61.8
Scheduled on-the-job food safety training conducted by plant personnel	11.1	4.5	24.8	42.2	35.6	49.1	69.5	66.1	72.7	51.2	48.0	54.3
Formal food safety course conducted by plant personnel	7.4	2.4	20.4	26.6	21.0	33.0	39.1	35.6	42.6	29.8	26.9	32.8
Formal food safety course conducted by professional trainers	0.0	0.0	0.0	3.1	1.4	6.6	10.2	8.2	12.5	6.3	5.1	7.8
Continuing food safety training[a]	(n = 27)			(n = 64)			(n = 128)			(n = 219)		
No continuing training	18.5	9.4	33.3	1.6	0.5	4.6	1.6	0.9	2.8	4.6	2.8	7.5
Written refresher materials given to employees	3.7	0.8	16.2	31.2	25.3	37.9	53.1	49.5	56.7	37.9	35.2	40.8
Continuing informal on-the-job food safety training	77.8	62.7	88.0	75.0	68.6	80.5	68.8	65.3	72.0	72.2	68.7	75.4
Scheduled on-the-job refresher food safety training conducted by plant personnel	3.7	0.8	16.2	32.8	26.7	39.5	60.2	56.6	63.6	42.2	39.4	45.0
Formal, periodic refresher course work conducted by plant personnel	7.4	2.4	20.4	31.2	25.3	37.9	38.3	34.9	41.8	30.7	27.8	33.7
Formal, periodic refresher course work conducted by professional trainers	0.0	0.0	0.0	9.4	6.1	14.2	22.7	19.8	25.8	14.8	12.9	16.9
HACCP training	(n = 27)			(n = 64)			(n = 128)			(n = 219)		
One or more production employees has completed formal HACCP training	85.2	70.9	93.1	93.8	89.5	96.4	96.1	94.4	97.3	93.4	90.7	95.4

[a]Respondents could select multiple responses.

Table 6-11. Percentage of Poultry Slaughter and Processing Plants that Have Operations Audited by Independent Third Parties, by HACCP Size

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Slaughter and deboning operations[a]	(n = 27)			(n = 64)			(n = 128)			(n = 219)		
Not audited	70.4	54.9	82.3	20.3	15.4	26.4	1.6	0.9	2.8	19.4	16.5	22.6
Auditors hired by plant or corporate headquarters	11.1	4.5	24.8	43.8	37.1	50.6	82.8	79.9	85.4	58.7	55.7	61.7
Customers	11.1	4.5	24.8	35.9	29.7	42.7	67.2	63.7	70.5	48.1	45.0	51.3
Auditors hired by customers	0.0	0.0	0.0	54.7	47.8	61.4	60.2	56.6	63.6	47.7	45.0	50.4
Further processing operations[a]	(n = 27)			(n = 64)			(n = 128)			(n = 219)		
Not audited	75.0	46.0	91.3	23.1	11.9	39.9	1.1	0.3	4.1	16.2	12.1	21.3
Auditors hired by plant or corporate headquarters	8.3	1.3	39.5	50.0	33.8	66.2	80.7	74.6	85.6	64.1	58.5	69.3
Customers	8.3	1.3	39.5	38.5	23.9	55.5	75.0	68.5	80.5	58.0	52.3	63.4
Auditors hired by customers	0.0	0.0	0.0	50.0	—	—	68.2	—	—	54.7	—	—

[a]Respondents could select multiple responses.

Note: "—" indicates that the confidence interval could not be estimated because there was only one observation (respondent) in a stratum for that question.

Table 6-12. Poultry Slaughter and Processing Plants' Responses to Other Selected Questions, by HACCP Size

	Very Small			Small			Large			All Plants		
		95% CI			95% CI			95% CI			95% CI	
	%	Low	High	%	Low	High	%	Low	High	%	Low	High
Percentage of live birds slaughtered during past year that were imported	(n = 27)			(n = 64)			(n = 128)			(n = 219)		
None	92.6	79.6	97.6	96.9	93.4	98.6	94.5	92.6	96.0	94.8	92.7	96.4
1 to 9 percent	0.0	0.0	0.0	3.1	1.4	6.6	3.1	2.1	4.6	2.6	1.8	3.7
20 to 24 percent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25 to 49 percent	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.3	1.7	0.4	0.2	0.9
50 percent or more	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
No response	7.4	2.4	20.4	0.0	0.0	0.0	1.6	0.9	2.8	2.2	1.1	4.4
Total	100.0			100.0			100.0			100.0		
Total amount of raw product produced in past year	(n = 27)			(n = 64)			(n = 128)			(n = 219)		
None	3.7	0.8	16.2	4.7	2.5	8.6	3.1	2.1	4.6	3.7	2.4	5.5
1 to 99,999 pounds	25.9	14.8	41.3	1.6	0.5	4.6	1.6	0.9	2.8	6.0	3.9	9.1
100,000 to 999,999 pounds	33.3	20.7	48.9	0.0	0.0	0.0	0.0	0.0	0.0	6.0	3.9	9.2
1,000,000 to 9,999,999 pounds	18.5	9.4	33.3	20.3	15.4	26.4	0.8	0.3	1.7	9.5	7.2	12.6
10,000,000 to 99,999,999 pounds	0.0	0.0	0.0	32.8	26.7	39.5	14.8	12.5	17.6	17.3	15.1	19.7
100,000,000 to 999,999,999 pounds	0.0	0.0	0.0	34.4	28.2	41.1	74.2	71.0	77.2	49.4	46.9	51.9
1,000,000,000 pounds or more	0.0	0.0	0.0	1.6	0.5	4.6	0.0	0.0	0.0	0.4	0.1	1.3
No response	18.5	9.4	33.3	4.7	2.5	8.6	5.5	4.0	7.4	7.6	5.5	10.5
Total	100.0			100.0			100.0			100.0		
Food safety manager	(n = 27)			(n = 64)			(n = 128)			(n = 219)		
Food safety manager on staff	44.4	30.2	59.7	68.8	62.1	74.7	85.9	83.2	88.3	73.5	69.8	76.9

7 Conclusion

We recommend that FSIS consider the recommendations presented in this section in future surveys of slaughter plants and the upcoming survey of processing-only plants.

This section summarizes lessons learned conducting the survey of meat and poultry slaughter and processing plants. We recommend that FSIS consider these findings in future surveys of slaughter plants and the upcoming survey of processing-only plants.

Although we did not achieve our target response rate of 75 percent for some strata (state-inspected plants and very small federally inspected plants), the survey response was quite good for an establishment survey. Response rates were higher among federally inspected plants compared to state-inspected plants. For meat plants, the weighted response rate was 70 percent for federally inspected plants and 60 percent for state-inspected plants. For poultry plants, the weighted response rate was 80 percent for federally inspected plants and 45 percent for state-inspected plants.

We attribute the lower response rate for state-inspected plants to three factors. First, the majority of state-inspected plants are very small plants, and we observed lower response rates for very small plants compared to small and large plants (see Table 4-1). Second, state-inspected plants may have been less motivated to complete the survey because they are not regulated by FSIS. Third, based on conversations that we had with state plants during survey administration, some state plants believed that the survey was not relevant because they do not use many of the technologies and processes that we asked about.

Based on these findings, for future surveys we recommended that FSIS work with FSLGRS to secure a letter from each state

with a state MPI program. The letter should describe the importance of participation and encourage state plants to complete the survey. We suggest that this letter be included with the prenotice letter from FSIS and as part of the survey packet. Also, we recommend tailoring some of the survey questions so that they are more applicable to very small plants (e.g., add pathogen-control practices commonly used by smaller plants to Question 1.9 of the meat survey). Finally, we suggest that the FSIS prenotice letter and information brochure be revised so that it emphasizes that FSIS needs data on all sizes of plants, including those that are very small, and on state-inspected plants.

For future industry surveys, we recommend

- additional activities to encourage response from state-inspected and very small plants,
- operation of an e-mail address by RTI to respond to survey questions, and
- revisions to the survey questionnaire to reduce item nonresponse and improve validity of the responses.

In future surveys, we plan to provide an e-mail address that plants can contact if they have questions when completing the survey. We will respond to the e-mails within 24 hours of receipt. We found that some plant owners and plant managers completed the survey during nonbusiness hours when the survey help line was not operating. An e-mail address will also help accommodate plants in the Pacific and Mountain Time zones and plants in the noncontinental United States, who may find it difficult to contact the survey help line during its hours of operation.

Based on lessons learned from the egg industry surveys, we revised the questionnaires for meat and poultry slaughter and processing plants. For example, we made substantial revisions to the microbiological testing section and allowed for multiple responses for some questions. However, during survey administration and analysis of the survey data, we identified additional issues that proved troublesome for respondents, required clarification, or resulted in high item nonresponse. Table 7-1 identifies suggested revisions for the questionnaires for meat and poultry slaughter and processing plants to reduce item nonresponse and improve the validity of survey responses. Where appropriate, we suggest that similar changes be incorporated in the survey of processing-only establishments and future egg industry and meat and poultry slaughter surveys.

Table 7-1. Suggested Questionnaire Revisions for Meat and Poultry Slaughter and Processing Plants[a]

Question Number		Issue	Solution
Meat Plants	**Poultry Plants**		
1.3 Who conducts independent, third-party **audits** of this plant's slaughter and fabrication operations? 2.8 Who conducts independent, third-party **audits** of this plant's further processing operations?	1.1, 2.8	Some respondents thought that audits included USDA inspections.	Add "This does not include government inspections" to definition of audits.
1.4 To the best of your knowledge, what percentage of live animals slaughtered at this plant during the past year were **imported**? Also Questions 1.5, 2.6, 2.7, and 2.12	1.4, 1.5, 2.6, 2.7, 2.11	Unclear what "past year" means.	Add text box in left margin that states "By past year we mean the most recently completed calendar or fiscal year."
1.7 What is the routine frequency used by this plant for sanitizing hands or gloves that contact raw product in the fabrication area of the plant? 3.5 Which methods of microbiological testing are used by this plant to test raw meat after fabrication?	—	Some plants do not have fabrication operations.	Add response option, "This plant does not have fabrication operations."
—	1.3 What is the routine frequency used by this plant for sanitizing hands or gloves that contact raw product in the deboning area of the plant? 3.4 Which methods of microbiological testing are used by this plant to test raw poultry after deboning?	Some plants do not debone carcasses.	Add response option, "This plant does not have deboning operations."
Questions that collect information on planned and future use of pathogen-control technologies (Questions 1.8 and 2.14)		Some technologies are not applicable for some species.	Add column to table, "Technology not applicable for species slaughtered."

(continued)

[a]We recommend that the same changes be made for the questionnaire for processing-only establishments.

Table 7-1. Suggested Questionnaire Revisions for Meat and Poultry Slaughter and Processing Plants (continued)

Question Number		Issue	Solution
Meat Plants	**Poultry Plants**		
2.2 What types of further processed food products does this plant produce?	2.2	Inconsistent responses for Questions 2.2, 3.7, 3.9, 3.12, and 3.13 (meat) and Questions 2.2, 3.6, 3.8, 3.11, and 3.12 (poultry) regarding the production of RTE and NRTE product.	For questions that ask about RTE and NRTE product, refer respondent back to their response for Question 2.2; for example in the meat survey, "complete Question 3.12 if your plant produces RTE product (circled '1' for Question 2.2)."
2.4 For domestic products produced by this plant, approximately how many have a **special statement or claim** on the label to identify the **origin** of the animal from which the product was made?	2.4	Unclear what "origin" means.	Insert the word "geographic" before "origin" within the question.
3.4 For each organism listed below, how frequently is microbiological testing done on carcasses prior to fabrication? Also, Questions 3.6, 3.8, and 3.10	3.3, 3.5, 3.7, and 3.9	High item nonresponse.	Add statement to instructions, "Circle '1' if you do not test for the organism." In the table, change "Never" to "Do not test."
5.12 How many USDA- or state-inspected plants are owned by the company that owns this plant?	5.13	Respondents did not know if they should include their plant in the count.	Insert the phrase, "including this plant" in the question.

References

Cates, S.C., C. Viator, S. Karns, and D.C. Kendall. August 2004. "Survey of Egg Packing and Egg Products Processing Plants." Prepared for the U.S. Department of Agriculture, Food Safety and Inspection Service.

SAS Institute, Inc. 1999. *SAS/STAT User's Guide*, Version 8, Cary, NC. SAS Institute, Inc.

StataCorp. 2005. *Stata Statistical Software: Release 8.2*. College Station, TX: Stata Corporation.

Viator, C.L., and D.L. Kendall. August 2002. "Pathogen Reduction and Other Technological Changes in the Meat, Poultry, and Egg Industries: Pretest Results Report." Prepared for the U.S. Department of Agriculture, Food Safety and Inspection Service.

Appendix A:
Survey Instruments

Meat Slaughter and Processing Plants

Form Approved: OMB No. 0583-0125
Expiration Date: 8-31-06
See OMB Statement on inside cover

FSIS

SURVEY OF MEAT SLAUGHTER & PROCESSING PLANTS

Place label here.

This survey applies only to the plant listed on this label. Refer to this label as instructed in the survey.

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspects of this collection of information, including suggestions for reducing this burden to:

Ron Meekhof
USDA, FSIS
300 12th Street SW, Room 112
Washington, DC 20250
Phone: 202-690-1816
E-mail: Ronald.Meekhof@fsis.usda.gov

An agency may not conduct or sponsor and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number.

If you have questions regarding your rights as a research participant, you may contact RTI's Office of Research Protection toll-free at 866-214-2043.

Instructions

RTI International (RTI)* is conducting a survey of meat slaughter and processing plants on behalf of the U.S. Department of Agriculture, Food Safety and Inspection Service (USDA, FSIS). This survey collects data about technologies and food safety practices used in the industry to control pathogens. FSIS needs accurate, up-to-date information to guide policy making and help the agency fulfill its regulatory responsibilities with the minimum burden possible to industry. This survey research will benefit the meat slaughter and processing industry by improving the agency's understanding of current industry practices.

The survey will take about 30 minutes to complete. Please answer each question by **circling** the appropriate response(s) for multiple-choice questions, or writing your answer legibly in the space provided for fill-in-the-blank questions. Please circle one response for each question unless otherwise specified. ***We ask that you consult with other members of your organization if you do not know the answer to a particular question***. For purposes of this survey, we use certain words to have particular meanings. For any word printed in **bold** type in a question, please read the definition provided in the margin near the question.

Please answer all questions as they pertain only to the specific plant named on the mailing label attached to the front of this survey booklet. ***By "plant" we mean all the buildings and facilities used in your slaughter and processing operations within the general area of the address shown on the mailing label***.

Your participation in this survey is voluntary, and we truly appreciate your help. We will keep your answers strictly ***confidential***. We will report only unidentified data to FSIS. We will not identify any of your answers to FSIS by your name, the name of your company, or your plant. We will also protect your privacy by reporting only aggregate results to the public.

Your participation in this survey is vitally important, and we thank you for your help. As a respondent to the survey, you will receive a summary report of survey results. ***We ask that you return the completed survey within 5 business days in the enclosed postage-paid return envelope, or to RTI, P.O. Box 12194, Research Triangle Park, NC 27709.***

Questions?

Call our Survey Helpline 877-446-0105 (toll-free)

If you have any questions as you complete the survey, please call our Survey Helpline toll-free at 877-446-0105 and ask for Catherine Viator. We operate the Helpline on weekdays from 9:00 a.m. to 5:00 p.m. EST.

*RTI International is a trade name of Research Triangle Institute.

1 Slaughter and Fabrication

1.1 How does this plant dehair carcasses? ***Circle all that apply.***

1. This plant does not dehair carcasses
2. Scald and rinse
3. Rosin dip

1.2 How does this plant dehide carcasses? ***Circle all that apply.***

1. This plant does not dehide carcasses
2. Skinning knife
3. Air knife
4. Mechanical side puller
5. Mechanical down puller
6. Mechanical up puller

By **audits** we mean review and verification of processes used by independent, third-party auditors.

1.3 Who conducts independent, third-party **audits** of this plant's slaughter and **fabrication** operations? ***Circle all that apply***.

1. This plant's slaughter and fabrication operations are not audited by independent, third-party auditors
2. Independent, third-party auditors that are hired by this plant or by corporate headquarters
3. Customers of this plant
4. Independent, third-party auditors that are hired by customers of this plant

By **fabrication** we mean the production of half- or quarter-carcasses, sub-primals, or primals. This does not include ground beef.

1.4 To the best of your knowledge, what percentage of live animals slaughtered at this plant during the past year was **imported**?

1. None
2. 1 to 9 percent
3. 10 to 24 percent
4. 25 to 49 percent
5. 50 percent or more

By **imported** we mean animals born or raised in another country, and then transported to the United States.

1.5 What was the total amount of raw product, not ground, primal cuts (HACCP Code 03C; e.g., whole cuts and steaks, trimmings, mechanically tenderized cuts) produced by this plant during the past year? ***If none, write in zero.***

_____ lbs.

1.6 What is the routine frequency used by this plant for sanitizing hands or gloves that contact raw product in the slaughter area of the plant? ***Circle only one response.***

1. Always before handling the next unit of product
2. More than once per hour
3. Once per hour
4. One or more times per shift, but less than once per hour
5. No specific routine frequency

1.7 What is the routine frequency used by this plant for sanitizing hands or gloves that contact raw product in the fabrication area of the plant? ***Circle only one response.***

1. Always before handling the next unit of product
2. More than once per hour
3. Once per hour
4. One or more times per shift, but less than once per hour
5. No specific routine frequency

1.8 For each technology listed below, please circle the response that applies for this plant's slaughter and fabrication operations. ***Circle only one response in each row of the table below***.

Technologies for Slaughter and Fabrication	This plant uses the technology now	This plant expects to begin using the technology within 1 to 3 years	This plant does not use and does not expect to use the technology within 1 to 3 years
a. Company-owned lab for microbiological testing	1	2	3
b. Bioluminescent testing system	1	2	3
c. Conveyor belts made from materials designed to prevent bacterial growth	1	2	3
d. Steam pasteurization systems (for example, the Frigoscandia)	1	2	3
e. Steam vacuum units	1	2	3
f. Organic acid rinse	1	2	3
g. Positive air pressure from clean side to dirty side	1	2	3
h. Metal detection equipment	1	2	3
i. Tempered carcass rinse/wash	1	2	3
j. Hock suckers	1	2	3
k. Equipment for removal of spinal cord prior to carcass splitting	1	2	3

1.9 For each practice listed below, please circle the response that applies for this plant's slaughter and fabrication operations. ***Circle only one response in each row of the table below***.

Practices for Slaughter and Fabrication	This plant uses the practice now	This plant expects to begin using the practice within 1 to 3 years	This plant does not use and does not expect to use the practice within 1 to 3 years
a. Requires and documents that its animal growers use stipulated production practices to control pathogens	1	2	3
b. Requires and documents that its animal growers use stipulated production practices to control chemical residues (e.g., drugs and growth hormones)	1	2	3
c. Rotates sanitizing chemicals it uses in the slaughter area on an annual basis or more frequently	1	2	3
d. Uses chemical sanitizers for food contact hand tools used in the slaughter area *during operations*	1	2	3
e. Uses sterilizer pots for heat sterilization of hand tools used in the slaughter area *during operations*	1	2	3
f. Has **written policies and procedures** for recalling product	1	2	3
g. Has written policies and procedures to protect against bioterrorism	1	2	3
h. Has written policies and procedures to control the use of **hazardous chemicals**	1	2	3
i. Has written policies and procedures that stipulate humane handling of animals	1	2	3
j. Identifies and tracks its products, by production lot, backward to specific animal growers	1	2	3
k. Identifies and tracks its products, by production lot, forward to specific buyers (not consumers) of its products	1	2	3

By **written policy and procedures** we mean a HACCP plan, SSOP, prerequisite program, or other written document that describes the plant's standard operating procedures.

By **hazardous chemicals** we mean substances such as pesticides, detergents, sanitizers, or lubricants.

1.10 Which of the following best describes this plant's slaughter operations for cattle?

1. This plant did not slaughter cattle during 2003 or 2004
   Skip to Question 2.1
2. This plant slaughtered cattle during 2003 and 2004
3. This plant slaughtered cattle during 2003 but stopped the slaughter of cattle during 2004
4. This plant slaughtered cattle during 2004, but not 2003

1.11 What method is most frequently used by this plant to determine the age of cattle at this establishment? ***Circle only one response.***

1. This plant does not currently slaughter cattle
2. No method is used; all cattle are treated as 30 months of age and older
3. **Dentition**
4. Documentation
5. Other (specify): _____

By **dentition** we mean examination of an animal's teeth to determine age.

1.12 For fed steers and heifers slaughtered by this plant, what proportion are on average treated as 30 months of age and older based on **dentition**?

1. This plant does not currently slaughter fed steers and heifers
2. This plant does not use dentition to determine age of cattle
3. Less than 1 percent
4. 1 to 2 percent
5. 3 to 5 percent
6. 6 to 10 percent
7. 11 to 20 percent
8. More than 20 percent

1.13 For cattle 30 months of age and older slaughtered by this plant, at what point is the body of the vertebral column removed for most of the cattle slaughtered? ***Circle only one response.***

1. This plant does not currently slaughter cattle 30 months of age and older
2. During the slaughter process at this plant
3. During the fabrication process at this plant
4. At another plant owned by the same company that owns this plant
5. At a plant not owned by the same company that owns this plant

In January 2004, FSIS issued new regulations regarding the handling of specified risk materials (SRMs) and disposition of non-ambulatory disabled cattle.

SRMs include the following:

- Brain, skull, eyes, trigeminal ganglia, spinal cord, vertebral column, and dorsal root ganglia (DRG) of cattle 30 months of age and older
- Tonsils and distil ileum of the small intestine of all cattle

1.14 How many <u>additional</u> procedures have been developed and implemented by this plant to ensure control in the removal of specified risk materials as a result of the interim final rule on the prohibition of the use of specified risk materials? ***See margin for information on specified risk materials.***

1. This plant does not currently slaughter cattle
2. None
3. 1 to 2
4. 3 to 4
5. 5 to 6
6. More than 6

1.15 Is this plant still accepting cattle 30 months of age and older since the interim final rule on the prohibition of the use of specified risk materials?

1. This plant did not accept cattle 30 months of age and older prior to the interim final rule
2. Yes, this plant accepts approximately the same number of cattle 30 months of age and older
3. Yes, but this plant accepts fewer cattle 30 months of age and older
4. Yes, but this plant accepts more cattle 30 months of age and older
5. No, this plant no longer accepts cattle 30 months of age and older

Please Read Before Continuing!

Questions 1.16 through 1.18 ask about this plant's operations during 2003. Please answer these questions for this plant's operations during 2003, that is, prior to the interim final rule on the prohibition of the use of specified risk materials.

1.16 During 2003, did this plant sell small intestines for human consumption?

1. This plant did not slaughter cattle during 2003
2. Yes
3. No

1.17 During 2003, which of the following materials were used in products for human consumption from cattle 30 months of age and older slaughtered by this plant? ***Circle all that apply.***

1. This plant did not slaughter cattle 30 months of age and older during 2003
2. Market heads (with or without eyes)
3. Brains (sold separately)
4. Eyes (sold separately)
5. Spinal cords
6. Vertebral columns, not including those within a whole carcass
7. Small intestines
8. Other materials (specify): _____
9. None of these materials

1.18 During 2003, which of the following bone-in cuts were fabricated at this plant from cattle 30 months of age and older? ***Circle all that apply.***

1. This plant did not slaughter or fabricate cattle 30 months of age and older during 2003
2. T-bone steaks
3. Porterhouse steaks
4. Bone-in or standing rib roasts
5. Blade or chuck roasts
6. Short loins
7. Other bone-in cuts (specify): _____
8. None of these cuts

2 Further Processing

By **further processing** we mean all processing beyond slaughter and fabrication.

By **RTE** we mean a product that is edible without additional preparation by the consumer to achieve food safety, but may receive additional preparation for taste or appearance purposes.

By **NRTE** we mean a product that is *not* edible without additional preparation by the consumer to achieve food safety.

By **validated** we mean verified through testing or research that the cooking procedures recommended kill pathogens at a targeted level.

By **special statement or claim** we mean a labeling statement that goes beyond those required by regulation. For example, we do not mean simply the corporate address of the company.

By **origin** we mean the country, state, or region in which the animal was born or raised.

By **manufactured** we mean slaughter, fabrication, or further processing.

2.1 Does this plant grind meat or **further process** meat products?

1. Yes
2. No **Skip to Question 3.1**

2.2 What types of further processed food products does this plant produce? ***Circle all that apply.***

1. Ready-to-eat (**RTE**) products for consumers
2. Not-ready-to-eat (**NRTE**) products for consumers
3. Products that are inputs to further processing by another plant

2.3 Thinking only about **NRTE** products for consumers that include cooking instructions on the label, for approximately how many of such products has the plant **validated** the cooking instructions?

1. This plant does not produce NRTE products
2. This plant's NRTE products do not have cooking instructions
3. None
4. Less than half
5. Half
6. More than half
7. All

2.4 For domestic products produced by this plant, approximately how many have a **special statement or claim** on the label to identify the **origin** of the animal from which the product was made?

1. None
2. Less than half
3. Half
4. More than half
5. All

2.5 For domestic products produced by this plant, approximately how many have a **special statement or claim** on the label to identify where (i.e., geographic location) the product was **manufactured**?

1. None
2. Less than half
3. Half
4. More than half
5. All

2.6 What percentage of raw meat processed at this plant during the past year was received or purchased from another plant?

1. None
2. 1 to 9 percent
3. 10 to 24 percent
4. 25 to 49 percent
5. 50 percent or more

By **imported** we mean meat from animals born or raised in another country, and then transported to the United States.

2.7 To the best of your knowledge, what percentage of raw meat processed at this plant during the past year was **imported** as raw meat?

1. None
2. 1 to 9 percent
3. 10 to 24 percent
4. 25 to 49 percent
5. 50 percent or more

By **audits** we mean review and verification of processes used by independent, third-party auditors.

2.8 Who conducts independent, third-party **audits** of this plant's further processing operations? ***Circle all that apply.***

1. This plant's further processing operations are not audited by independent, third-party auditors
2. Independent, third-party auditors that are hired by this plant or by corporate headquarters
3. Customers of this plant
4. Independent, third-party auditors that are hired by customers of this plant

2.9 What is the routine frequency used by this plant for sanitizing hands or gloves that contact raw meat in the further processing area of the plant? ***Circle only one response.***

1. Always before handling the next unit of product
2. More than once per hour
3. Once per hour
4. One or more times per shift, but less than once per hour
5. No specific routine frequency

2.10 What is the routine frequency used by this plant for sanitizing hands or gloves that contact RTE product? ***Circle only one response.***

1. This plant does not produce RTE product
2. Always before handling the next unit of product
3. More than once per hour
4. Once per hour
5. One or more times per shift, but less than once per hour
6. No specific routine frequency

2.11 What is the routine frequency used by this plant for sanitizing product handling equipment (such as spatulas, forks, or tongs) that contacts RTE product? ***Circle only one response.***

1. This plant does not produce RTE product
2. Always before handling the next unit of product
3. More than once per hour
4. Once per hour
5. One or more times per shift, but less than once per hour
6. Daily
7. At the end of each production lot
8. No specific routine frequency

2.12 For each HACCP product category listed below, provide your best estimate of the total pounds produced by this plant during the past year. ***Write in zero for any product category that is not produced at this plant.***

All answers you give in this survey will be kept strictly confidential.

HACCP Product Category	Pounds of Annual Production	Example Products*
a. Raw, ground meat (03B)	lbs.	Ground beef, ground pork, fresh pork sausage, other raw sausages, preformed raw patties
b. Thermally processed, commercially sterile (03D)	lbs.	Canned beef stew, canned pasta with meat, canned chili, baked beans with ham, canned soups, canned Vienna sausages, canned luncheon meat
c. Not heat treated, shelf stable (03E)	lbs.	Fermented sausages, dry sausages, semi-dry sausages, summer sausage, pepperoni, dry salami, uncooked vinegar pickled product
d. Heat treated, shelf stable (03F)	lbs.	Jerky, snack sticks, popped pork skins, cooked vinegar pickled product
e. Fully cooked, not shelf stable (03G)	lbs.	Hams, roast beef, hot dogs, luncheon meats, beef pot pie, burritos
f. Heat treated, but not fully cooked, not shelf stable (03H)	lbs.	Partially cooked meat patties, smoked sausage, partially cooked bacon
g. Secondary inhibitors, not shelf stable (03I)	lbs.	Uncooked bacon, pastrami, corned beef, cured beef tongue, country-style ham, prosciutto

* Some plants may categorize products differently than shown in the table. Refer to your HACCP plan to determine the HACCP product category for the products produced by this plant.

2.13 For each practice listed below, please circle the response that applies for this plant's further processing operations. ***Circle only one response in each row of the table below.***

Practices for Further Processing	This plant uses the practice now	This plant expects to begin using the practice within 1 to 3 years	This plant does not use and does not expect to use the practice within 1 to 3 years	Not applicable
a. Requires and documents that suppliers who ship raw meat to this plant for further processing use stipulated practices to control pathogens	1	2	3	4
b. Requires and documents that suppliers who ship raw meat to this plant for further processing use stipulated practices to control chemical residues (e.g., drugs or growth hormones)	1	2	3	4
c. Treats its drains with sanitizers for pathogen control	1	2	3	
d. Uses chemical sanitizers for hand tools such as knives, spatulas, or tongs used in further processing areas *during operations*	1	2	3	
e. Rotates sanitizing chemicals it uses in the further processing area on an annual basis or more frequently	1	2	3	
f. Treats food contact equipment to remove biomatter *during operations*	1	2	3	
g. Uses antimicrobial treatment for food contact equipment *during operations*	1	2	3	
h. Has **written policies and procedures** for recalling further processed product	1	2	3	

By **written policy and procedures** we mean a HACCP plan, SSOP, prerequisite program, or other written document that describes the plant's standard operating procedures.

2.14 For each technology listed below, please circle the response that applies for this plant's further processing operations. ***Circle only one response in each row of the table below.***

Technologies for Further Processing	This plant uses the technology now	This plant expects to begin using the technology within 1 to 3 years	This plant does not use and does not expect to use the technology within 1 to 3 years
a. Conveyor belts made of materials designed to prevent bacterial growth	1	2	3
b. Metal detection equipment	1	2	3
c. Irradiation equipment	1	2	3
d. High pressure processing	1	2	3
e. Infrared technology	1	2	3
f. Application of antimicrobial chemicals	1	2	3
g. Other types of pasteurization	1	2	3

3 Microbiological Testing Practices

3.1 In addition to the generic *E. coli* testing of carcasses required by FSIS regulation, does this plant conduct microbiological testing using either its own lab or an independent commercial lab?

1. Yes
2. No **Skip to Question 3.11**

FSIS regulation requires plants to conduct generic E. coli testing of carcasses. Plants may conduct other testing of products, equipment, and food contact surfaces that is voluntary, including any Listeria testing. Please answer Questions 3.2 – 3.14 for voluntary testing that is conducted by this plant.

3.2 Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test hides prior to slaughter? ***Circle all that apply.***

1. This plant does not test hides prior to slaughter
2. Traditional cultural methods
3. Enzyme linked immunoassay (ELISA)
4. Polymerase chain reaction (PCR)
5. Other rapid methods

3.3 Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test carcasses prior to fabrication? ***Circle all that apply.***

1. This plant does not test carcasses prior to fabrication
   Skip to Question 3.5
2. Traditional cultural methods
3. Enzyme linked immunoassay (ELISA)
4. Polymerase chain reaction (PCR)
5. Other rapid methods

3.4 For each organism listed below, how frequently is microbiological testing done on carcasses prior to fabrication? ***Circle only one response in each row of the table below.***

Organisms	Frequency of Microbiological Testing on Carcasses Prior to Fabrication								
	Never	**Less than Once per Month**	**Once per Month**	**More than Once per Month**	**Once per Week**	**More than Once per Week**	**Once per Day**	**Once per Shift**	**More than Once per Shift**
a. Aerobic plate count (APC)	1	2	3	4	5	6	7	8	9
b. Total plate count (TPC)	1	2	3	4	5	6	7	8	9
c. Total coliforms	1	2	3	4	5	6	7	8	9
d. Generic *E. coli* (voluntary)	1	2	3	4	5	6	7	8	9
e. *E. coli* O157:H7	1	2	3	4	5	6	7	8	9
f. *Staphylococcus aureus*	1	2	3	4	5	6	7	8	9
g. *Salmonella* species	1	2	3	4	5	6	7	8	9
h. *Listeria* species	1	2	3	4	5	6	7	8	9
i. *Listeria monocytogenes*	1	2	3	4	5	6	7	8	9
j. Yeasts and molds	1	2	3	4	5	6	7	8	9

By **fabrication** we mean the production of half- or quarter-carcasses, sub-primals, or primals. This does not include ground beef.

3.5 Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test raw meat after **fabrication** (i.e., before processing)? ***Circle all that apply.***

1. This plant does not test raw meat **Skip to Question 3.7**
2. Traditional cultural methods
3. Enzyme linked immunoassay (ELISA)
4. Polymerase chain reaction (PCR)
5. Other rapid methods

For each organism listed below, how frequently is microbiological testing done on raw meat after **fabrication** (i.e., before processing)? ***Circle only one response in each row of the table below.***

Organisms	Frequency of Microbiological Testing on Raw Meat After Fabrication								
	Never	**Less than Once per Month**	**Once per Month**	**More than Once per Month**	**Once per Week**	**More than Once per Week**	**Once per Day**	**Once per Shift**	**More than Once per Shift**
a. Aerobic plate count (APC)	1	2	3	4	5	6	7	8	9
b. Total plate count (TPC)	1	2	3	4	5	6	7	8	9
c. Total coliforms	1	2	3	4	5	6	7	8	9
d. Generic *E. coli*	1	2	3	4	5	6	7	8	9
e. *E. coli* O157:H7	1	2	3	4	5	6	7	8	9
f. *Staphylococcus aureus*	1	2	3	4	5	6	7	8	9
g. *Salmonella* species	1	2	3	4	5	6	7	8	9
h. *Listeria* species	1	2	3	4	5	6	7	8	9
i. *Listeria monocytogenes*	1	2	3	4	5	6	7	8	9
j. Yeasts and molds	1	2	3	4	5	6	7	8	9

By **RTE** we mean a product that is edible without additional preparation by the consumer to achieve food safety, but may receive additional preparation for taste or appearance purposes.

3.7 Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test ready-to-eat **(RTE)** finished product? ***Circle all that apply.***

1. This plant does not produce RTE product **Skip to Question 3.9**
2. This plant does not test RTE product **Skip to Question 3.9**
3. Traditional cultural methods
4. Enzyme linked immunoassay (ELISA)
5. Polymerase chain reaction (PCR)
6. Other rapid methods

For each organism listed below, how frequently is microbiological testing done on **RTE** finished product? ***Circle only one response in each row of the table below***.

Organisms	Frequency of Microbiological Testing on RTE Finished Product								
	Never	**Less than Once per Month**	**Once per Month**	**More than Once per Month**	**Once per Week**	**More than Once per Week**	**Once per Day**	**Once per Shift**	**More than Once per Shift**
a. Aerobic plate count (APC)	1	2	3	4	5	6	7	8	9
b. Total plate count (TPC)	1	2	3	4	5	6	7	8	9
c. Total coliforms	1	2	3	4	5	6	7	8	9
d. Generic *E. coli*	1	2	3	4	5	6	7	8	9
e. *E. coli* O157:H7	1	2	3	4	5	6	7	8	9
f. *Staphylococcus aureus*	1	2	3	4	5	6	7	8	9
g. *Salmonella* species	1	2	3	4	5	6	7	8	9
h. *Listeria* species	1	2	3	4	5	6	7	8	9
i. *Listeria monocytogenes*	1	2	3	4	5	6	7	8	9
j. Yeasts and molds	1	2	3	4	5	6	7	8	9
k. *C. perfringens*	1	2	3	4	5	6	7	8	9

By **NRTE** we mean a product that is *not* edible without additional preparation by the consumer to achieve food safety.

3.9 Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test not-ready-to-eat (**NRTE**) finished product? ***Circle all that apply.***

1. This plant does not produce NRTE product **Skip to Question 3.11**
2. This plant does not test NRTE product **Skip to Question 3.11**
3. Traditional cultural methods
4. Enzyme linked immunoassay (ELISA)
5. Polymerase chain reaction (PCR)
6. Other rapid methods

For each organism listed below, how frequently is microbiological testing done on **NRTE** finished product? ***Circle only one response in each row of the table below.***

Organisms	Frequency of Microbiological Testing on NRTE Finished Product								
	Never	**Less than Once per Month**	**Once per Month**	**More than Once per Month**	**Once per Week**	**More than Once per Week**	**Once per Day**	**Once per Shift**	**More than Once per Shift**
a. Aerobic plate count (APC)	1	2	3	4	5	6	7	8	9
b. Total plate count (TPC)	1	2	3	4	5	6	7	8	9
c. Total coliforms	1	2	3	4	5	6	7	8	9
d. Generic *E. coli*	1	2	3	4	5	6	7	8	9
e. *E. coli* O157:H7	1	2	3	4	5	6	7	8	9
f. *Staphylococcus aureus*	1	2	3	4	5	6	7	8	9
g. *Salmonella* species	1	2	3	4	5	6	7	8	9
h. Yeasts and molds	1	2	3	4	5	6	7	8	9

By **environmental sampling** we mean sampling for indicator or target micro-organisms on product contact surfaces and surfaces of equipment and facility structures.

3.11 What methods does this plant use to test **environmental samples**? ***Circle all that apply.***

1. This plant does not conduct environmental testing
   Skip to Question 4.1
2. Traditional cultural methods
3. Adenosine trisodium phosphate (ATP) bioluminescence
4. Enzyme linked immunoassay (ELISA)
5. Polymerase chain reaction (PCR)
6. Other rapid methods

Please Read Before Continuing!

If your plant produces ready-to-eat (**RTE**) product, please answer **Question 3.12**.
If your plant produces not-ready-to-eat (**NRTE**) product, please answer **Question 3.13**.
If your plant produces both **RTE** and **NRTE** products, please answer both **Questions 3.12 & 3.13.**

3.12 How frequently is environmental sampling done for each **RTE** area listed below? ***Circle only one response in each row of the table below***.

RTE Areas Sampled	Frequency of Environmental Sampling									
	Never	Less than Once per Month	Once per Month	More than Once per Month	Once per Week	More than Once per Week	Once per Day	Once per Shift	More than Once per Shift	No Specific Routine Frequency
a. Equipment surfaces that come into direct contact with **RTE** product	1	2	3	4	5	6	7	8	9	10
b. Equipment surfaces that do not come into direct contact with **RTE** product	1	2	3	4	5	6	7	8	9	10
c. Walls	1	2	3	4	5	6	7	8	9	10
d. Overhead structures	1	2	3	4	5	6	7	8	9	10
e. Drains	1	2	3	4	5	6	7	8	9	10

3.13 How frequently is environmental sampling done for each **NRTE** area listed below? ***Circle only one response in each row of the table below***.

NRTE Areas Sampled	Frequency of Environmental Sampling									
	Never	Less than Once per Month	Once per Month	More than Once per Month	Once per Week	More than Once per Week	Once per Day	Once per Shift	More than Once per Shift	No Specific Routine Frequency
a. Equipment surfaces that come into direct contact with **NRTE** product	1	2	3	4	5	6	7	8	9	10
b. Equipment surfaces that do not come into direct contact with **NRTE** product	1	2	3	4	5	6	7	8	9	10
c. Walls	1	2	3	4	5	6	7	8	9	10
d. Overhead structures	1	2	3	4	5	6	7	8	9	10
e. Drains	1	2	3	4	5	6	7	8	9	10

By **environmental sampling** we mean sampling for indicator or target micro-organisms on product contact surfaces and surfaces of equipment and facility structures.

3.14 How frequently does this plant's **environmental sampling** include testing for *Listeria* species? ***Circle only one response.***

1. Never
2. Less than once per month
3. Once per month
4. More than once per month
5. Once per week
6. More than once per week
7. Once per day
8. Once per shift
9. More than once per shift
10. No specific routine frequency

4 Employee Training

By **food safety training** we mean training to teach concepts and practices for handling food to control biological, chemical, and physical hazards.

By **newly hired** we mean any production employee who has worked at the plant less than one month.

By **formal food safety course** we mean a designed course of study that uses prepared materials and follows a specified outline of content.

By **continuing food safety training** we mean training provided to employees periodically that is designed to refresh or extend the initial food safety training the plant provides to new hires.

By **HACCP** we mean Hazard Analysis and Critical Control Points. HACCP training teaches principles and practices of a formal seven-step method for promoting food safety in food manufacturing processes.

4.1 What **food safety training** is provided for **newly hired** production employees of this plant? ***Circle all that apply.***

1. No food safety training for new hires
2. Written food safety training materials are given to new hires
3. Informal, unscheduled on-the-job food safety training
4. Scheduled on-the-job food safety training conducted by plant personnel
5. **Formal food safety course** conducted by plant personnel
6. Formal food safety course conducted by professional trainers

4.2 What **continuing food safety training** is provided for production employees of this plant? ***Circle all that apply.***

1. No continuing food safety training for employees
2. Written refresher materials are given to employees
3. Continuing informal on-the-job food safety training
4. Scheduled on-the-job refresher food safety training conducted by plant personnel
5. Formal, periodic refresher course work conducted by plant personnel
6. Formal, periodic refresher course work conducted by professional trainers

4.3 Approximately how many production employees currently working at this plant have completed formal **HACCP** training (for example, a 3 to 5 day course)?

1. None
2. 1 to 3 employees
3. 4 to 9 employees
4. 10 to 20 employees
5. More than 20 employees

5 Plant Characteristics

By **plant** we mean the buildings and facilities used in your slaughter, fabrication, and processing operations within the general area of the address shown on the mailing label.

By **renovated** we mean major reconstruction or re-design of at least 25 percent of the plant.

5.1 In what calendar year was this **plant** built? If this plant was recently **renovated,** enter the calendar year for the renovation. ***If the plant has multiple sections, provide the year for the newest section.***

— — — —

5.2 What is the approximate total square footage of the production space for this **plant**?

_____ square feet

5.3 Calculated as a percentage of total square footage given in Question 5.2, what is the approximate percentage of the square footage of the production space of this plant that is under 5 years old, 5 years to just under 20 years old, or 20 years old or more? ***Your responses should sum to 100%.***

1. Under 5 years old [_____%]
2. 5 years to just under 20 years old [_____%]
3. 20 years old or more [_____%]

100%

5.4 How many slaughter and fabrication shifts does this plant operate daily?

1. This plant does not operate on a daily basis
2. One
3. Two
4. Three

5.5 How many further processing shifts does this plant operate daily?

1. None
2. Further processing shift is not operated on a daily basis
3. One
4. Two
5. Three

5.6 How many clean up shifts does this plant operate daily? This includes cleanups conducted by production and processing personnel, sanitation crews, and contractors.

1. None
2. Clean up shift is not operated on a daily basis
3. One
4. Two
5. Three

By **full-time equivalent** we mean a count of full-time and part-time employees where part-time employees are reported as an appropriate fraction of a full-time position.

5.7 Approximately how many people are employed at this plant? ***Provide your response in full-time equivalents.***

_____ **Full-time equivalents**

5.8 Does this plant have a person on staff whose primary responsibility is to manage food safety activities at the plant (i.e., food safety manager)?

1. Yes
2. No **Skip to Question 5.10**

5.9 Approximately what percentage of this plant's food safety manager's time is devoted to managing food safety activities at the plant?

1. 1 to 24 percent
2. 25 to 49 percent
3. 50 to 74 percent
4. 75 to 99 percent
5. 100 percent

5.10 Does this plant have a quality control/quality assurance department?

1. Yes
2. No **Skip to Question 5.12**

5.11 Approximately how many employees at this plant work in the plant's quality control/quality assurance department? ***Provide your response in full-time equivalents.***

_____ **Full-time equivalents**

5.12 How many USDA or state inspected plants are owned by the company that owns this plant?

1. 1
2. 2 to 5
3. 6 to 20
4. 21 or more

All answers you give in this survey will be kept strictly confidential.

5.13 What was the approximate value of total plant sales revenue for the most recently completed fiscal year?

1. Under $2.5 million
2. $2.5 million to $24.9 million
3. $25 million to $49.9 million
4. $50 million to $99.9 million
5. $100 million to $249.9 million
6. $250 million to $499.9 million
7. $500 million to $999.9 million
8. $1 billion or more

Poultry Slaughter and Processing Plants

Form Approved: OMB No. 0583-0125
Expiration Date: 8-31-06
See OMB Statement on inside cover

FSIS

SURVEY OF POULTRY SLAUGHTER & PROCESSING PLANTS

Place label here.

This survey applies only to the plant listed on this label. Refer to this label as instructed in the survey.

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspects of this collection of information, including suggestions for reducing this burden to:

Ron Meekhof
USDA, FSIS
300 12th Street SW, Room 112
Washington, DC 20250
Phone: 202-690-1816
e-mail: Ronald.Meekhof@fsis.usda.gov

An agency may not conduct or sponsor and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number.

If you have questions regarding your rights as a research participant, you may contact RTI's Office of Research Protection toll-free at 866-214-2043.

Instructions

RTI International (RTI)* is conducting a survey of poultry slaughter and processing plants on behalf of the U.S. Department of Agriculture, Food Safety and Inspection Service (USDA, FSIS). This survey collects data about technologies and food safety practices used in the industry to control pathogens. FSIS needs accurate, up-to-date information to guide policy making and help the agency fulfill its regulatory responsibilities with the minimum burden possible to industry. This survey research will benefit the poultry slaughter and processing industry by improving the agency's understanding of current industry practices.

The survey will take about 30 minutes to complete. Please answer each question by **circling** the appropriate answer(s) for multiple-choice questions, or writing your answer legibly in the space provided for fill-in-the-blank questions. Please circle one response for each question unless otherwise specified. ***We ask that you consult with other members of your organization if you do not know the answer to a particular question***. For purposes of this survey, we use certain words to have particular meanings. For any word printed in **bold** type in a question, please read the definition provided in the margin near the question.

Please answer all questions as they pertain only to the specific plant named on the mailing label attached to the front of this survey booklet. ***By "plant" we mean all the buildings and facilities used in your slaughter and processing operations within the general area of the address shown on the mailing label***.

Your participation in this survey is voluntary, and we truly appreciate your help. We will keep your answers strictly ***confidential***. We will report only unidentified data to FSIS. We will not identify any of your answers to FSIS by your name, the name of your company, or your plant. We will also protect your privacy by reporting only aggregate results to the public.

Your participation in this survey is vitally important, and we thank you for your help. As a respondent to the survey, you will receive a summary report of survey results. ***We ask that you return the completed survey within 5 business days in the enclosed postage-paid return envelope, or to RTI, P.O. Box 12194, Research Triangle Park, NC 27709.***

Questions?

Call our Survey Helpline 877-446-0105 (toll-free)

If you have any questions as you complete the survey, please call our Survey Helpline toll-free at 877-446-0105 and ask for Catherine Viator. We operate the Helpline on weekdays from 9:00 a.m. to 5:00 p.m. EST.

*RTI International is a trade name of Research Triangle Institute.

1 Slaughter and Deboning

By **audits** we mean review and verification of processes used by independent, third-party auditors.

1.1 Who conducts independent, third-party **audits** of this plant's slaughter and deboning operations? ***Circle all that apply.***

1. This plant's slaughter and deboning operations are not audited by independent, third-party auditors
2. Independent, third-party auditors that are hired by this plant or by corporate headquarters
3. Customers of this plant
4. Independent, third-party auditors that are hired by customers of this plant

1.2 What is the routine frequency used by this plant for sanitizing hands or gloves that contact raw poultry in the slaughter area of the plant? ***Circle only one response.***

1. Always before handling the next unit of product
2. More than once per hour
3. Once per hour
4. One or more times per shift, but less than once per hour
5. No specific routine frequency

1.3 What is the routine frequency used by this plant for sanitizing hands or gloves that contact raw poultry in the deboning area of the plant? ***Circle only one response.***

1. Always before handling the next unit of product
2. More than once per hour
3. Once per hour
4. One or more times per shift, but less than once per hour
5. No specific routine frequency

By **imported** we mean birds born or raised in another country, and then transported to the United States.

1.4 To the best of your knowledge, what percentage of live birds slaughtered at this plant during the past year was **imported**?

1. None
2. 1 to 9 percent
3. 10 to 24 percent
4. 25 to 49 percent
5. 50 percent or more

1.5 What was the total amount of raw product, not ground, primal cuts (HACCP Code 03C; e.g., whole birds, tray packed poultry, breaded cuts) produced by this plant during the past year? ***If none, write in zero.***

_____ lbs.

1.6 For each technology listed below, please circle the response that applies for this plant. ***Circle only one response in each row of the table below.***

Technologies for Slaughter and Deboning	This plant uses the technology now	This plant expects to begin using the technology within 1 to 3 years	This plant does not use and does not expect to use the technology within 1 to 3 years
a. Company-owned lab for microbiological testing	1	2	3
b. Bioluminescent testing system	1	2	3
c. Conveyor belts made from materials designed to prevent bacterial growth	1	2	3
d. Inside-outside bird washers	1	2	3
e. Organic acid rinse	1	2	3
f. Metal detection equipment	1	2	3
g. Automatic bird transfer (from kill line to evisceration line)	1	2	3

1.7 For each practice listed below, please circle the response that applies for this plant. ***Circle only one response in each row of the table below.***

Practices for Slaughter and Deboning	This plant uses the practice now	This plant expects to begin using the practice within 1 to 3 years	This plant does not use and does not expect to use the practice within 1 to 3 years
a. Requires and documents that its bird growers use stipulated production practices to control pathogens	1	2	3
b. Requires and documents that its bird growers use stipulated production practices to control chemical residues (e.g., drugs)	1	2	3
c. Rotates sanitizing chemicals it uses in the slaughter area on an annual basis or more frequently	1	2	3
d. Uses chemical sanitizers for food contact hand tools used in the slaughter area *during operations*	1	2	3
e. Uses sterilizer pots for heat sterilization of hand tools used in the slaughter area *during operations*	1	2	3
f. Has **written policies and procedures** for recalling product	1	2	3
g. Has written policies and procedures to protect against bioterrorism	1	2	3
h. Has written policies and procedures to control the use of **hazardous chemicals**	1	2	3
i. Has written policies and procedures for humane handling of birds	1	2	3
j. Identifies and tracks its products, by production lot, backward to specific bird growers	1	2	3
k. Identifies and tracks its products, by production lot, forward to specific buyers (not consumers) of its products	1	2	3
l. Conducts fat pad sampling on a regular schedule	1	2	3

By **written policy and procedures** we mean a HACCP plan, SSOP, prerequisite program, or other written document that describes the plant's standard operating procedures.

By **hazardous chemicals** we mean substances such as pesticides, detergents, sanitizers, or lubricants.

2 Further Processing

By **further processing** we mean all processing beyond slaughter and deboning.

By **RTE** we mean a product that is edible without additional preparation by the consumer to achieve food safety, but may receive additional preparation for taste or appearance purposes.

By **NRTE** we mean a product that is *not* edible without additional preparation by the consumer to achieve food safety.

By **validated** we mean verified through testing or research that the cooking procedures recommended kill pathogens at a targeted level.

By **special statement or claim** we mean a labeling statement that goes beyond those required by regulation. For example, we do not mean simply the corporate address of the company.

By **origin** we mean the country, state, or region in which the animal was born or raised.

2.1 Does this plant grind poultry or **further process** poultry products?

1. Yes
2. No **Skip to Question 3.1**

2.2 What types of further processed food products does this plant produce? ***Circle all that apply.***

1. Ready-to-eat (**RTE**) products for consumers
2. Not-ready-to-eat (**NRTE**) products for consumers
3. Products that are inputs to further processing by another plant

2.3 Thinking only about **NRTE** products for consumers that include cooking instructions on the label, for approximately how many of such products has the plant **validated** the cooking instructions?

1. This plant does not produce NRTE products
2. This plant's NRTE products do not have cooking instructions
3. None
4. Less than half
5. Half
6. More than half
7. All

2.4 For domestic products produced by this plant, approximately how many have a **special statement or claim** on the label to identify the **origin** of the animal from which the product was made?

1. None
2. Less than half
3. Half
4. More than half
5. All

By **manufactured** we mean slaughter, deboning, or further processing.

2.5 For domestic products produced by this plant, approximately how many have a **special statement or claim** on the label to identify where (i.e., geographic location) the product was **manufactured**?

1. None
2. Less than half
3. Half
4. More than half
5. All

2.6 What percentage of raw poultry processed at this plant during the past year was received or purchased from another plant?

1. None
2. 1 to 9 percent
3. 10 to 24 percent
4. 25 to 49 percent
5. 50 percent or more

By **imported** we mean raw poultry from birds born or raised in another country, and then transported to the United States.

2.7 To the best of your knowledge, what percentage of raw poultry processed at this plant during the past year was **imported** as raw poultry?

1. None
2. 1 to 9 percent
3. 10 to 24 percent
4. 25 to 49 percent
5. 50 percent or more

By **audits** we mean review and verification of processes used by independent, third-party auditors.

2.8 Who conducts independent, third-party **audits** of this plant's further processing operations? ***Circle all that apply.***

1. This plant's further processing operations are not audited by independent, third-party auditors
2. Independent, third-party auditors that are hired by this plant or by corporate headquarters
3. Customers of this plant
4. Independent, third-party auditors that are hired by customers of this plant

2.9 For each practice listed below, please circle the response that applies for this plant's further processing operations. ***Circle only one response in each row of the table below.***

Practices for Further Processing	This plant uses the practice now	This plant expects to begin using the practice within 1 to 3 years	This plant does not use and does not expect to use the practice within 1 to 3 years	Not applicable
a. Requires and documents that suppliers who ship raw poultry to this plant for further processing use stipulated practices to control pathogens	1	2	3	4
b. Requires and documents that suppliers who ship raw poultry to this plant for further processing use stipulated practices to control chemical residues (e.g., drugs)	1	2	3	4
c. Treats its drains with sanitizers for pathogen control	1	2	3	
d. Uses chemical sanitizers for hand tools such as knives, spatulas, or tongs used in further processing areas *during operations*	1	2	3	
e. Rotates sanitizing chemicals it uses in the further processing area on an annual basis or more frequently	1	2	3	
f. Treats food contact equipment to remove biomatter *during operations*	1	2	3	
g. Uses antimicrobial treatment for food contact equipment *during operations*	1	2	3	
h. Has **written policies and procedures** for recalling further processed product	1	2	3	

By **written policy and procedures** we mean a HACCP plan, SSOP, prerequisite program, or other written document that describes the plant's standard operating procedures.

2.10 For each technology listed below, please circle the response that applies for this plant's further processing operations. ***Circle only one response in each row of the table below***.

Technologies for Further Processing	This plant uses the technology now	This plant expects to begin using the technology within 1 to 3 years	This plant does not use and does not expect to use the technology within 1 to 3 years
a. Conveyor belts made from materials designed to prevent bacterial growth	1	2	3
b. Metal detection equipment	1	2	3
c. Irradiation equipment	1	2	3
d. High pressure processing	1	2	3
e. Infrared technology	1	2	3
f. Application of antimicrobial chemicals	1	2	3
g. Other types of pasteurization	1	2	3

2.11 For each HACCP product category listed below, provide your best estimate of the total pounds produced by this plant during the past year. ***Write in zero for any product category that is not produced at this plant.***

All answers you give in this survey will be kept strictly confidential.

HACCP Product Category	Pounds of Annual Production	Example Products*
a. Raw, ground poultry (03B)	lbs.	Ground turkey, ground chicken, preformed raw patties
b. Thermally processed, commercially sterile (03D)	lbs.	Canned soups, canned pasta with poultry, canned chicken and dumplings, canned luncheon meat
c. Not heat treated, shelf stable (03E)	lbs.	Fermented sausages, dry sausages, semi-dry sausages, uncooked vinegar pickled product
d. Heat treated, shelf stable (03F)	lbs.	Turkey jerky, snack sticks, cooked vinegar pickled product
e. Fully cooked, not shelf stable (03G)	lbs.	Hot dogs, luncheon meats, turkey or chicken pot pie, burritos, chicken salad
f. Heat treated, but not fully cooked, not shelf stable (03H)	lbs.	Partially cooked chicken or turkey patties, partially cooked turkey bacon
g. Secondary inhibitors, not shelf stable (03I)	lbs.	Uncooked turkey bacon

* Some plants may categorize products differently than shown in the table. Refer to your HACCP plan to determine the HACCP product category for the products produced by this plant.

2.12 What is the routine frequency used by this plant for sanitizing hands or gloves that contact raw poultry in the further processing area of this plant? ***Circle only one response.***

1. Always before handling the next unit of product
2. More than once per hour
3. Once per hour
4. One or more times per shift, but less than once per hour
5. No specific routine frequency

2.13 What is the routine frequency used by this plant for sanitizing hands or gloves that contact RTE product? ***Circle only one response.***

1. This plant does not produce RTE product
2. Always before handling the next unit of product
3. More than once per hour
4. Once per hour
5. One or more times per shift, but less than once per hour
6. No specific routine frequency

2.14 What is the routine frequency used by this plant for sanitizing product handling equipment (such as spatulas, forks, and tongs) that contacts RTE product? ***Circle only one response.***

1. This plant does not produce RTE product
2. Always before handling the next unit of product
3. More than once per hour
4. Once per hour
5. One or more times per shift, but less than once per hour
6. Daily
7. At the end of each production lot
8. No specific routine frequency

3 Microbiological Testing Practices

3.1 In addition to the generic *E. coli* testing of carcasses required by FSIS regulation, does this plant conduct microbiological testing using either its own lab or an independent commercial lab?

1. Yes
2. No **Skip to Question 3.10**

FSIS regulation requires plants to conduct generic E. coli testing of carcasses. Plants may conduct other testing of products, equipment, and food contact surfaces that is voluntary, including any Listeria testing. Please answer Questions 3.2 – 3.13 for voluntary testing that is conducted by this plant.

3.2 Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test carcasses prior to deboning? ***Circle all that apply.***

1. This plant does not test carcasses prior to deboning
   Skip to Question 3.4
2. Traditional cultural methods
3. Enzyme linked immunoassay (ELISA)
4. Polymerase chain reaction (PCR)
5. Other rapid methods

3.3 For each organism listed below, how frequently is microbiological testing done on carcasses prior to deboning? ***Circle only one response in each row of the table below.***

Organisms	Frequency of Microbiological Testing on Carcasses Prior to Deboning								
	Never	**Less than Once per Month**	**Once per Month**	**More than Once per Month**	**Once per Week**	**More than Once per Week**	**Once per Day**	**Once per Shift**	**More than Once per Shift**
a. Aerobic plate count (APC)	1	2	3	4	5	6	7	8	9
b. Total plate count (TPC)	1	2	3	4	5	6	7	8	9
c. Total coliforms	1	2	3	4	5	6	7	8	9
d. *Salmonella* species	1	2	3	4	5	6	7	8	9
e. *Salmonella* Enteritidis	1	2	3	4	5	6	7	8	9
f. *Campylobacter jejuni*	1	2	3	4	5	6	7	8	9
g. Generic *E. coli* (voluntary)	1	2	3	4	5	6	7	8	9
h. *Staphylococcus aureus*	1	2	3	4	5	6	7	8	9
i. *Listeria* species	1	2	3	4	5	6	7	8	9
j. *Listeria monocytogenes*	1	2	3	4	5	6	7	8	9
k. Yeasts and molds	1	2	3	4	5	6	7	8	9

3.4 Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test raw poultry after deboning (i.e., before processing)? ***Circle all that apply.***

1. This plant does not test raw poultry **Skip to Question 3.6**
2. Traditional cultural methods
3. Enzyme linked immunoassay (ELISA)
4. Polymerase chain reaction (PCR)
5. Other rapid methods

3.5 For each organism listed below, how frequently is microbiological testing done on raw poultry after deboning (i.e., before processing)? ***Circle only one response in each row of the table below.***

Organisms	Frequency of Microbiological Testing on Raw Poultry After Deboning								
	Never	Less than Once per Month	Once per Month	More than Once per Month	Once per Week	More than Once per Week	Once per Day	Once per Shift	More than Once per Shift
a. Aerobic plate count (APC)	1	2	3	4	5	6	7	8	9
b. Total plate count (TPC)	1	2	3	4	5	6	7	8	9
c. Total coliforms	1	2	3	4	5	6	7	8	9
d. *Salmonella* species	1	2	3	4	5	6	7	8	9
e. *Salmonella* Enteritidis	1	2	3	4	5	6	7	8	9
f. *Campylobacter jejuni*	1	2	3	4	5	6	7	8	9
g. Generic *E. coli*	1	2	3	4	5	6	7	8	9
h. *Staphylococcus aureus*	1	2	3	4	5	6	7	8	9
i. *Listeria* species	1	2	3	4	5	6	7	8	9
j. *Listeria monocytogenes*	1	2	3	4	5	6	7	8	9
k. Yeasts and molds	1	2	3	4	5	6	7	8	9

By **RTE** we mean a product that is edible without additional preparation by the consumer to achieve food safety, but may receive additional preparation for taste or appearance purposes.

3.6 Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test **ready-to-eat (RTE)** finished product? ***Circle all that apply.***

1. This plant does not produce RTE product **Skip to Question 3.8**
2. This plant does not test RTE product **Skip to Question 3.8**
3. Traditional cultural methods
4. Enzyme linked immunoassay (ELISA)
5. Polymerase chain reaction (PCR)
6. Other rapid methods

For each organism listed below, how frequently is microbiological testing done on **RTE** finished product? ***Circle only one response in each row of the table below.***

Organisms	Frequency of Microbiological Testing on RTE Finished Product								
	Never	**Less than Once per Month**	**Once per Month**	**More than Once per Month**	**Once per Week**	**More than Once per Week**	**Once per Day**	**Once per Shift**	**More than Once per Shift**
a. Aerobic plate count (APC)	1	2	3	4	5	6	7	8	9
b. Total plate count (TPC)	1	2	3	4	5	6	7	8	9
c. Total coliforms	1	2	3	4	5	6	7	8	9
d. *Salmonella* species	1	2	3	4	5	6	7	8	9
e. *Salmonella* Enteritidis	1	2	3	4	5	6	7	8	9
f. *Campylobacter jejuni*	1	2	3	4	5	6	7	8	9
g. Generic *E. coli*	1	2	3	4	5	6	7	8	9
h. *Staphylococcus aureus*	1	2	3	4	5	6	7	8	9
i. *Listeria* species	1	2	3	4	5	6	7	8	9
j. *Listeria monocytogenes*	1	2	3	4	5	6	7	8	9
k. Yeasts and molds	1	2	3	4	5	6	7	8	9
l. *C. perfringens*	1	2	3	4	5	6	7	8	9

3.8 Which methods of microbiological testing are used by this plant, by either its own lab or an independent commercial lab, to test **not-ready-to-eat (NRTE)** finished product? ***Circle all that apply.***

By **NRTE** we mean a product that is *not* edible without additional preparation by the consumer to achieve food safety.

1. This plant does not produce NRTE product **Skip to Question 3.10**
2. This plant does not test NRTE product **Skip to Question 3.10**
3. Traditional cultural methods
4. Enzyme linked immunoassay (ELISA)
5. Polymerase chain reaction (PCR)
6. Other rapid methods

For each organism listed below, how frequently is microbiological testing done on **NRTE** finished product? ***Circle only one response in each row of the table below.***

Organisms	Frequency of Microbiological Testing on NRTE Finished Product								
	Never	**Less than Once per Month**	**Once per Month**	**More than Once per Month**	**Once per Week**	**More than Once per Week**	**Once per Day**	**Once per Shift**	**More than Once per Shift**
a. Aerobic plate count (APC)	1	2	3	4	5	6	7	8	9
b. Total plate count (TPC)	1	2	3	4	5	6	7	8	9
c. Total coliforms	1	2	3	4	5	6	7	8	9
d. *Salmonella* species	1	2	3	4	5	6	7	8	9
e. *Salmonella* Enteritidis	1	2	3	4	5	6	7	8	9
f. *Campylobacter jejuni*	1	2	3	4	5	6	7	8	9
g. Generic *E. coli*	1	2	3	4	5	6	7	8	9
h. *Staphylococcus aureus*	1	2	3	4	5	6	7	8	9
i. Yeasts and molds	1	2	3	4	5	6	7	8	9

By **environmental sampling** we mean sampling for indicator or target micro-organisms on product contact surfaces and surfaces of equipment and facility structures.

3.10 What method does this plant use to test **environmental samples**? ***Circle all that apply.***

1. This plant does not conduct environmental testing
   Skip to Question 4.1
2. Traditional cultural methods
3. Adenosine trisodium phosphate (ATP) bioluminescence
4. Enzyme linked immunoassay (ELISA)
5. Polymerase chain reaction (PCR)
6. Other rapid methods

Please Read Before Continuing!

If your plant produces ready-to-eat (**RTE**) product, please answer **Question 3.11**.
If your plant produces not-ready-to-eat (**NRTE**) product, please answer **Question 3.12**.
If your plant produces both **RTE** and **NRTE** products, please answer both **Questions 3.11 & 3.12.**

3.11 How frequently is environmental sampling done for each **RTE** area listed below? ***Circle only one response in each row of the table below.***

RTE Areas Sampled	Frequency of Environmental Sampling									
	Never	Less than Once per Month	Once per Month	More than Once per Month	Once per Week	More than Once per Week	Once per Day	Once per Shift	More than Once per Shift	No Specific Routine Frequency
a. Equipment surfaces that come into direct contact with **RTE** product	1	2	3	4	5	6	7	8	9	10
b. Equipment surfaces that do not come into direct contact with **RTE** product	1	2	3	4	5	6	7	8	9	10
c. Walls	1	2	3	4	5	6	7	8	9	10
d. Overhead structures	1	2	3	4	5	6	7	8	9	10
e. Drains	1	2	3	4	5	6	7	8	9	10

3.12 How frequently is environmental sampling done for each **NRTE** area listed below? ***Circle only one response in each row of the table below.***

NRTE Areas Sampled	Frequency of Environmental Sampling									
	Never	Less than Once per Month	Once per Month	More than Once per Month	Once per Week	More than Once per Week	Once per Day	Once per Shift	More than Once per Shift	No Specific Routine Frequency
a. Equipment surfaces that come into direct contact with **NRTE** product	1	2	3	4	5	6	7	8	9	10
b. Equipment surfaces that do not come into direct contact with **NRTE** product	1	2	3	4	5	6	7	8	9	10
c. Walls	1	2	3	4	5	6	7	8	9	10
d. Overhead structures	1	2	3	4	5	6	7	8	9	10
e. Drains	1	2	3	4	5	6	7	8	9	10

3.13 How frequently does this plant's **environmental sampling** include testing for *Listeria* species? ***Circle only one response.***

1. Never
2. Less than once per month
3. Once per month
4. More than once per month
5. Once per week
6. More than once per week
7. Once per day
8. Once per shift
9. More than once per shift
10. No specific routine frequency

By **environmental sampling** we mean sampling for indicator or target micro-organisms on product contact surfaces and surfaces of equipment and facility structures.

4 Employee Training

By **food safety training** we mean training to teach concepts and practices for handling food to control biological, chemical, and physical hazards.

By **newly hired** we mean any production employee who has worked at the plant less than one month.

By **formal food safety course** we mean a designed course of study that uses prepared materials and follows a specified outline of content.

By **continuing food safety training** we mean training provided to employees periodically that is designed to refresh or extend the initial food safety training the plant provides to new hires.

By **HACCP** we mean Hazard Analysis and Critical Control Points. HACCP training teaches principles and practices of a formal seven-step method for promoting food safety in food manufacturing processes.

4.1 What **food safety training** is provided for **newly hired** production employees of this plant? ***Circle all that apply.***

1. No food safety training for new hires
2. Written food safety training materials are given to new hires
3. Informal, unscheduled on-the-job food safety training
4. Scheduled on-the-job food safety training conducted by plant personnel
5. **Formal food safety course** conducted by plant personnel
6. Formal food safety course conducted by professional trainers

4.2 What **continuing food safety training** is provided for production employees of this plant? ***Circle all that apply.***

1. No continuing food safety training for employees
2. Written refresher materials are given to employees
3. Continuing informal on-the-job food safety training
4. Scheduled on-the-job refresher food safety training conducted by plant personnel
5. Formal, periodic refresher course work conducted by plant personnel
6. Formal, periodic refresher course work conducted by professional trainers

4.3 Approximately how many production employees currently working at this plant have completed formal **HACCP** training (for example, a 3 to 5 day course)?

1. None
2. 1 to 3 employees
3. 4 to 9 employees
4. 10 to 20 employees
5. More than 20 employees

5 Plant Characteristics

By **plant** we mean the buildings and facilities used in your slaughter, deboning, and processing operations within the general area of the address shown on the mailing label.

By **renovated** we mean major reconstruction or re-design of at least 25 percent of the plant.

5.1 In what calendar year was this **plant** built? If this plant was recently **renovated,** enter the calendar year for the renovation. ***If the plant has multiple sections, provide the year for the newest section.***

__ __ __ __

5.2 What is the approximate total square footage of the production space for this **plant**?

_____ square feet

5.3 Calculated as a percentage of total square footage given in Question 5.2, what is the approximate percentage of the square footage of the production space of this plant that is under 5 years old, 5 years to just under 20 years old, or 20 years old or more? ***Your responses should sum to 100%.***

1. Under 5 years old [_____%]
2. 5 years to just under 20 years old [_____%]
3. 20 years old or more [_____%]

100%

5.4 How many slaughter and evisceration shifts does this plant operate daily?

1. This plant does not operate on a daily basis
2. One
3. Two
4. Three

5.5 How many deboning shifts does this plant operate daily?

1. None
2. Deboning shift is not operated on a daily basis
3. One
4. Two
5. Three

5.6 How many further processing shifts does this plant operate daily?

1. None
2. Further processing shift is not operated on a daily basis
3. One
4. Two
5. Three

5.7 How many clean up shifts does this plant operate daily? This includes cleanups conducted by production and processing personnel, sanitation crews, and contractors.

1. None
2. Clean-up shift is not operated on a daily basis
3. One
4. Two
5. Three

By **full-time equivalent** we mean a count of full-time and part-time employees where part-time employees are reported as an appropriate fraction of a full-time position.

5.8 Approximately how many people are employed at this plant? ***Provide your response in full-time equivalents.***

_____**full-time equivalents**

5.9 Does this plant have a person on staff whose primary responsibility is to manage food safety activities at the plant (i.e., food safety manager)?

1. Yes
2. No **Skip to Question 5.11**

5.10 Approximately what percentage of this plant's food safety manager's time is devoted to managing food safety activities at the plant?

1. 1 to 24 percent
2. 25 to 49 percent
3. 50 to 74 percent
4. 75 to 99 percent
5. 100 percent

5.11 Does this plant have a quality control/quality assurance department?

1. Yes
2. No **Skip to Question 5.13**

5.12 Approximately how many employees at this plant work in the plant's quality control/quality assurance department? ***Provide your response in full-time equivalents.***

_____**full-time equivalents**

5.13 How many USDA or state inspected plants are owned by the company that owns this plant?

1. 1
2. 2 to 5
3. 6 to 20
4. 21 or more

All answers you give in this survey will be kept strictly confidential.

5.14 What was the approximate value of total plant sales revenue for the most recently completed fiscal year?

1. Under $2.5 million
2. $2.5 million to $24.9 million
3. $25 million to $49.9 million
4. $50 million to $99.9 million
5. $100 million to $249.9 million
6. $250 million to $499.9 million
7. $500 million to $999.9 million
8. $1 billion or more

Appendix B:

Trade Association Correspondence and Materials

Article in AAMP Newletter (AAMPlifier)
September 15, 2004

RTI Sending Inspection Survey RTI International, an FSIS contractor, will be contacting selected meat and poultry plants this month to collect information about current practices and technologies. The survey is voluntary and takes about 30 minutes to complete. AAMP recommends that you complete the survey, if requested, since it can provide information to assist FSIS in considering inspection changes to eliminate inefficiency or unnecessary inspection activities.

Posted on AAMP Web Site (www.aamp.com)
September 2004

FSIS Meat and Poultry Slaughter and Processing Survey

FSIS has been given the go ahead to start a survey of meat and poultry slaughter and processing plants on September 7. The survey will be administered by RTI. RTI will start contacting plant managers in mid-September. Additional information on the survey can be found in the brochure (PDF document). – *Posted 9/1/04 by JBW*.

Note: The Web site included a link to the information brochure for the survey.

E-mail from American Meat Institute to its Membership
September 2004

TO: AMI Members
FROM: Mark Dopp
Skip Seward
Lynn Kosty

RE: FSIS survey

The Office of Management and Budget (OMB) has approved the Food Safety and Inspection Service's (FSIS or the agency) survey for meat and poultry slaughter and processing facilities. The survey is being conducted by RTI International (RTI) on behalf of the agency. Participation is voluntary and all answers will be kept confidential and reported to the agency in summary form. AMI encourages you to participate in the survey if contacted. Collection of accurate industry data is critical because FSIS needs up-to-date information when developing any new policies and regulations for the industry. RTI plans to begin contacting facilities by phone on September 7, 2004.

This survey is designed to collect up-to-date information about current practices and technologies used by meat and poultry slaughter and processing plants to control pathogens and enhance food safety. The survey also asks questions about pathogen testing practices, food safety training for employees, and plant characteristics. AMI provided suggestions on the survey questions and format to RTI in early August.

RTI intends to survey 1,398 federal and state inspected slaughter and processing facilities. Of these, 1,080 are randomly selected meat slaughter and processing facilities and 318 are poultry slaughter and processing facilities. Attached is a brochure from RTI that provides answers to commonly asked questions related to the survey. RTI will begin contacting facility managers September 7 through September 16 to make them aware of the survey. The phone call will be followed by a letter from FSIS that provides additional information on the survey. RTI will FedEx you the survey so that you can complete it at your convenience.

Please feel free to contact Mark Dopp, Skip Seward, or Lynn Kosty with any questions you may have regarding this memorandum.

cc: J. Patrick Boyle

J. Hodges

R. Huffman

E-mail from National Chicken Council to Its Membership
September 1, 2004

The Food Safety and Inspection Service has commissioned RTI International to conduct a new survey of meat and poultry slaughter and processing facilities on current practices and technologies that are being used to control foodborne pathogens. Actually there are four separate surveys designed specifically for poultry slaughter, poultry processing, meat slaughter, and meat processing. NCC has had the opportunity to review and comment on the draft and final poultry surveys. The attached brochure, which will accompany the survey, has additional information.

RTI plans to contact a total of 1,398 facilities, both federal and state inspected. Of these, 318 will be poultry slaughter and/or processing facilities. Although participation in the survey is voluntary, we (NCC staff) encourage your facilities to participate to ensure that the survey results are statistically representative of our industry. Individual plant responses will be kept strictly confidential by RTI and only summary data will be presented to FSIS.

Next week RTI will begin contacting individual plants to identify the plant manager (for sending a pre-notice letter) and will begin contacting plant managers around mid-September. Please let your plant managers know about this survey and encourage them to participate.

Stephen Pretanik
Director of Science & Technology
National Chicken Council
1015 15th Street, NW, Suite 930
Washington, DC 20005-2622

Note: A copy of the e-mail was included with the survey packet.

E-mail from National Turkey Federation to Its Membership
September 2, 2004

RTI International has been contracted by FSIS to conduct a survey of meat/poultry slaughter and processing establishments. The survey is "designed to collect accurate, up-to-date information about current industry practices and technologies used in the meat and poultry industries to control pathogens and promote food safety." RTI will begin contacting slaughter establishments in the coming weeks. They will be surveying every federally and state inspected poultry slaughter facility. RTI will send a pre-notice letter on FSIS letterhead to the plant manager soon with general information on the survey. RTI will then follow-up with the plant manager to confirm to whom the survey should be sent. Once that person is identified, RTI will send the survey out via USPS. If the survey is not completed and returned, RTI will send follow-up reminders via mail and by telephone.

The survey consists of five sections – 1) Slaughter and Deboning, 2) Further Processing, 3) Microbial Testing Practices, 4) Employee Training, and 5) Plant Characteristics. RTI estimates the survey will take about 30 minutes to complete and can be completed in writing or over the phone.

All responses will be kept confidential and the report that is sent to FSIS will not contain any identifying information. In fact, the results will only be reported to FSIS in summary form – no individual responses or respondents will be reported to the agency. All survey respondents will receive a copy of the final report at the project's completion. RTI estimates that the survey report will be completed by late Spring 2005.

While your response to the survey is voluntary, NTF encourages you to complete this survey so that FSIS has an accurate and complete picture of the industry. If you have any questions or concerns, please feel free to contact me. An informative brochure on the survey is attached for your information.

Brie C. Wilson
Manager, Government Affairs
National Turkey Federation
1225 New York Avenue, NW Suite 400
Washington, DC 20005

Appendix C:

FSIS Prenotice Letter and Information Brochure

[FSIS Letterhead]

September 17, 2004

Plant Manager
Plant Name
Street Address
City, State Zip

Dear (Plant Manager):

The Food Safety and Inspection Service (FSIS) is conducting a survey, and we are asking for your help.

The purpose of the survey is to add to our understanding of the current processing practices and technologies used in the meat and poultry slaughter and processing industries to control pathogens and promote food safety. The information from this survey will help ensure that FSIS develops regulations that are science-based and efficient in improving food safety and that also minimize the potential economic burden on establishments such as yours.

Your establishment is among the 1,400 meat and poultry establishments that were randomly selected to participate in the survey. Without your response, the survey results will not properly reflect industry practices. Therefore, your help is crucial. I am requesting that you—or someone that you designate at your establishment—complete the survey.

FSIS has contracted with RTI International (RTI) to develop and conduct this nationwide survey. A representative from RTI will call you soon to ask for your help, and RTI will send you the survey to complete at your convenience.

As RTI has done with other surveys it has conducted for Federal agencies, RTI will keep individual responses to this survey completely confidential. Neither FSIS employees nor others will be able to identify the survey results for a particular establishment. The results of the survey will be reported only in summary form so that individual responses or respondents can not be identified. Those who respond to the survey will receive a summary report of the survey results.

If you have questions about the survey, please do not hesitate to contact Dr. Ron Meekhof, the Agency's principal economist for this survey, at (202) 690-1816 or at Ronald.Meekhof@fsis.usda.gov.

FSIS appreciates your help in this important endeavor.

Sincerely,

Barbara Masters

Barbara J. Masters
Acting Administrator

Enclosure

Q. What is this study about?

A. This new survey, sponsored by the Food Safety and Inspection Service (FSIS), is designed to collect accurate, up-to-date information about current practices and technologies used by meat and poultry slaughter and processing plants to control pathogens and promote food safety. The survey also asks questions about pathogen testing practices, food safety training for employees, and plant characteristics. FSIS has contracted with RTI International (RTI) to develop and conduct this nationwide survey.

Q. Why should I complete this survey?

A. Accurate, up-to-date information is needed by FSIS to help the agency avoid unnecessary or inefficient regulation of your industry. The information you provide will help FSIS meet its regulatory responsibilities with the minimum burden possible for industry.

Your participation in the survey is voluntary, but to ensure that survey results are statistically representative for the whole industry, we cannot substitute another plant in your place if you decide not to participate. Without your help, data gathered by this survey could be incomplete and misleading.

All plants that respond to the survey will receive a summary report of survey results. By participating in the survey, you have an opportunity to be one of the first in your industry to review summary information about current pathogen control practices and technologies used by plants in your industry.

Q. How long will it take for me to complete the survey?

A. The survey should take less than 30 minutes to complete.

Q. When should I return my completed survey?

A. We ask that you return the completed questionnaire as soon as possible. Periodically, RTI will send follow-up reminders and make reminder phone calls to plants that have not returned a completed questionnaire. To reduce the need for follow-up contacts, please return your completed questionnaire within one week.

Q. How was I selected to participate?

A. Your plant was selected as part of a random sample of all meat and poultry slaughter and processing plants in the United States, using methods to ensure statistically valid results. That's one reason your response to the survey is so important. Without your response, the sampling methods used to select your plant could fail to produce information that accurately represents the industry.

Q. Is the survey confidential?

A. Absolutely. As it has for other surveys it conducts for federal agencies, RTI will keep individual responses to this survey completely confidential. Neither FSIS nor others will be able to identify the survey results for a particular plant. The results of the survey will be reported only in summary form so as to not identify individual responses or respondents.

Q. Who is RTI International?*

A. RTI International (RTI) is a not-for-profit contract research institute located in North Carolina's Research Triangle Park. With an established history of conducting scientific research for many government agencies, RTI is a proven leader in statistically valid survey research. RTI will conduct the survey, tabulate data collected, and summarize survey results in a report to FSIS.

Q. How can I find out more about this survey?

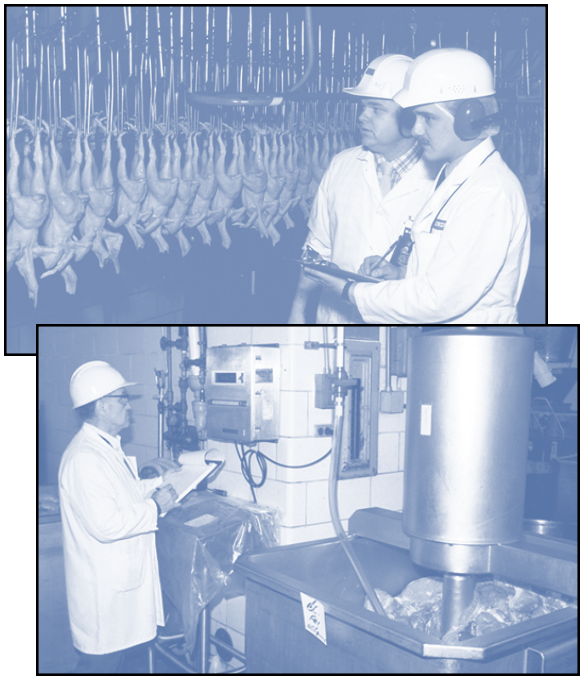
A. For further information about this survey, please contact one of the following individuals:

Ron Meekhof
USDA, FSIS
300 12th Street S.W.
Annex Building, Room 112
Washington, DC 20250-3700
Telephone: (202) 690-1816
E-mail: Ronald.Meekhof@fsis.usda.gov

Catherine Viator
RTI International
3040 Cornwallis Road
P.O. Box 12194
Research Triangle Park, NC 27709
Telephone: (877) 446-0105 (a toll-free #)
E-mail: viator@rti.org

*RTI International is a trade name of Research Triangle Institute

Survey of Meat and Poultry Slaughter and Processing Plants on Current Practices and Technologies for Controlling Pathogens



FSIS

Appendix D:
Thank You/ Reminder Postcard

October X, 2004

Dear (Respondent Name):

Recently, you received a survey on the current practices and technologies used in the meat and poultry slaughter and processing industries for controlling pathogens. RTI International (RTI) is conducting this survey for FSIS. If you have already returned the survey, we would like to thank you. Your assistance is very much appreciated.

If you have not yet returned the survey, please complete the survey and mail it back to us using the return envelope that was included with your survey. The information that you provide will help ensure that FSIS develops regulations that are science-based and efficient and that also minimize the potential economic burden on establishments such as yours.

If you have any questions, please contact me toll-free at 1-877-446-0105 or viator@rti.org. Thank you again.

Sincerely,
Catherine Viator