

## B. STATISTICAL METHODS

This section describes the statistical methods for the information collection and the survey procedures. Appendix 4 describes the survey weighting procedures, Appendix 5 provides the script for the initial and follow-up telephone calls, and Appendix 6 provides other survey materials used to contact respondents (i.e., pre-notification letters, reminder postcards, and survey brochure).

### B.1 Respondent Universe and Sampling Methods

#### (i) Respondent Universe

FSIS plans to survey federally inspected meat slaughter and processing establishments. These establishments slaughter beef, pork, lamb, and/or goat for commercial purposes (i.e., custom-exempt only slaughter establishments will not be surveyed).

The following types of establishments will not be surveyed because they do not slaughter amenable species intended for human consumption.

- Import-only facilities
- Establishments that produce only edible fats or animal food
- Establishments that are in-distribution warehouses and do not have any slaughter activities
- Establishments that only slaughter/process nonamenable (i.e., not inspected) species

#### (ii) Sampling Methods

Stratified, systematic sampling will be used to ensure accurate representation of subpopulations of interest.

#### *Sampling Frame*

FSIS's Public Health Inspection System (PHIS) will be used to develop the sampling frame. PHIS provides information on inspection authority code, inspection status, location, contact information, slaughter volumes, and other information for all federally-inspected establishments. Establishments were considered to be federally inspected if they have a federal or Talmadge-Aiken<sup>1</sup> inspection authority code. Establishments operating for objectives that are not strictly commercial<sup>2</sup> and establishments located in a U.S. territory (because of the potential

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<sup>1</sup> Talmadge-Aiken plants are federal establishments inspected by state inspection staff.

<sup>2</sup> The following types of establishments will be excluded: universities, religious organizations, prisons, Native American organizations, and state and federal government facilities. Exclusions will be based on the name of the

for language barriers in completing the survey) will be excluded from the sampling frame so that the frame is representative of the vast majority of commercial establishments inspected by FSIS.

To ensure comparability of results between this survey and the previous survey, the target populations used in both surveys will be compared. The target population will be defined for the new survey to match the previous definition for federally inspected establishments. The frame will be constructed using similar procedures as used previously. After constructing the frame, the two frames will be compared, and establishments will be identified that are new to the current frame or that are not on the new frame but were on the previous frame. These establishments will be checked and verified that they are correctly either included or excluded from the frame.

*Stratification*

To allow for a comparison of survey results among establishments of different sizes, the sample will be stratified based on the three HACCP size categories, yielding three sampling strata. Meat establishments are classified by FSIS into one of three size categories, based on the Pathogen Reduction (PR)/HACCP Final Rule (very small, small, or large). Table B-1 shows the number of establishments in the survey universe or population by HACCP size. This information is based on information currently available in PHIS and will be updated before the survey is conducted so that the most current information is used for drawing the sample. Establishments that have their inspection suspended or withdrawn by FSIS during the survey administration period will not be contacted and will be considered ineligible for the survey.

**Table B-1. Number of Meat Slaughter & Processing Establishments in the Survey Universe by HACCP Size**

<b>Size</b>	<b>Number</b>
VS	501
S	182
L	62
UK	0
Total	745

Notes: VS = very small (9 or fewer employees, or annual sales less than \$2.5 million); S = small (10 to 499 employees); L = large (500 or more employees); UK = unknown size.

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establishment.

### *Precision*

An indication of the expected precision of sample survey estimates is the widths of 95% 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. Precision levels of  $\pm 10\%$ ,  $5\%$ , and  $2\%$  were considered. Precision of  $\pm 10\%$  would be insufficient to allow high-quality economic impact analysis of regulatory actions. Data collection for a precision level of  $\pm 2\%$ , although desirable, would be prohibitively expensive. Thus, precision at  $\pm 5\%$  was used for the sample design. The sample design provides for sample sizes that are expected to yield precision of  $\pm 5\%$  or better for estimates of all percentages. The sample sizes were calculated assuming proportions of 0.5 (50%), which allow for precision requirements to be met for all proportions. Also, the design effect was factored into the sample size calculation. The design effect was based on the last round of the survey.

### *Sample Design*

The required sample size will be adjusted upward for anticipated eligibility and response rates. The eligibility rate accounts for establishments with inaccurate information in the sampling frame, establishments that no longer slaughter or process, or establishments that are out of business. The eligibility rate is based on the actual eligibility rate observed for the first round of surveys. An overall response rate of 70% is expected, based on experience with the first round of the survey which had a response rate of 70% for federal establishments. Response rates were higher for large and small establishments compared with very small establishments.

The sample design for this survey matches that of the previous survey. After the sample of very small establishments is selected, the distribution of the sample will be compared with the distribution of the previous sample using variables available on both frames. The percentage of very small establishments in the new sample that were also in the previous sample (i.e., overlap) will also be determined. If either of these checks reveals results that are not conducive to comparability of survey results, the sample design can be reconsidered.

The sample design for the meat slaughter and processing survey is expected to yield 417 completed surveys (see Table B-2). For each stratum (HACCP size), information is provided on the survey universe, starting sample size, the estimated number of eligible establishments, and

the required sample yield. For the large and small strata, the sample size required to achieve the desired level of precision will require sampling all establishments in the population (i.e., taking a census). Systematic sampling will be used to select the sample for the very small stratum, as described below.

### *Systematic Sampling*

Systematic sampling will be used to select the sample for the very small stratum. The purpose of systematic sampling (instead of random sampling) is to ensure that samples selected adequately represent the entire target universe or population. Systematic sampling within each stratum forces each sample to include establishments with varying characteristics. With simple random sampling the sample could be biased, because of coincidence, by including too many or too few of particular categories of establishments, causing the sample to misrepresent the target universe.

With systematic sampling, establishments in the sampling frame are first sorted and ordered within each stratum by a set of appropriate characteristics. Once sorted and ordered, sample points are selected by choosing every  $n$ th establishment in the sorted and ordered list until the entire sample is drawn. The factor  $n$  is calculated as the universe size of the stratum, divided by the sample size for the stratum. For the stratum where a census was not taken, a reserve sample will also be selected in the event that the actual eligibility and/or response rates are lower than anticipated. For the very small establishments, information on species slaughtered (calves, cattle, goats, lambs, swine) and region (Northeast, Midwest, South, West) will be used for the systematic sampling.

### *Estimation*

Statistical estimates will be generated by applying appropriate survey weights to the respondent record data. Appendix 4 describes the procedures for computing survey weights.

**Table B-2. Sample Design**

	Federal			Total
	VS	S	L	
Survey universe	501	182	62	745
Starting sample size	403	182	62	647
Eligible establishments <sup>a</sup>	367	162	61	590
Required sample yield <sup>b</sup>	242	125	50	417

<sup>a</sup> The eligibility rates are based on those observed for federally inspected establishments in the first round of the survey: 91% for very small establishments, 89% for small establishments, and 98% for large establishments.

<sup>b</sup> The response rates are based on the weighted rates for federally inspected establishments in the first round of the survey: 66% for very small establishments, 77% for small establishments, and 82% for large establishments.

Notes: VS = very small (9 or fewer employees, or annual sales less than \$2.5 million); S = small (10 to 499 employees); L = large (500 or more employees); NA = not applicable.

## **B.2 Procedures for the Collection of Information**

The survey procedures to be followed by the contractor are described below. With the exception of offering respondents the option to complete the survey by mail or Internet, the survey procedures are the same as those used for the initial survey. Appendix 5 provides the script for the initial and follow-up telephone calls, and Appendix 6 provides other survey materials used to contact respondents (i.e., prenotice letter, reminder postcard, and survey brochure).

- Contact with inspection personnel: FSIS will send an e-mail to each district manager with information on the surveys, who will then notify Inspectors-in-Charge (IICs) about the upcoming survey to verify the legitimacy of the survey to plant management, if necessary.
- Initial telephone call: The survey contractor will contact each establishment to obtain the plant manager's name and physical address. A script of the telephone call is provided in Appendix 5.
- FSIS prenotice letter: The survey contractor will send a letter to plant managers. The letter—on FSIS letterhead and signed by the administrator of FSIS—will explain the purpose of the survey, the importance of participation, and the survey contractor's pledge of privacy. The letter will also promise respondents that they will receive a copy of the survey results. The information brochure—a two-color, trifold brochure—will highlight the purpose of the study and provide contact information for FSIS and the survey contractor. Appendix 6 provides a copy of the letters and brochure.

- Respondent identification telephone call: Ten days after mailing the prenotice letters, the survey contractor will contact plant managers at sampled establishments to verify their eligibility for participating in the survey.

As part of this telephone call, the target respondent for the survey will be identified (i.e., the plant manager or a delegate) and the desired mode of data collection (mail or Internet) will be determined. A script of this telephone call is provided in Appendix 5.

- Survey packet mailing or e-mail notification: The contractor will send the survey packet via Federal Express or send an e-mail notifying the respondent of the survey's availability on the Internet. The Federal Express survey packet will include a metered (i.e., prepaid) envelope for returning the completed questionnaire to the survey contractor.
- Thank you/reminder postcard or e-mail: One week after mailing the survey packets, the survey contractor will send sampled establishments a postcard (mail) or e-mail (Internet). This notification will serve as a thank you for those who have returned the completed survey and as a reminder for those who have not. Appendix 6 provides copies of the postcard and e-mail notification.
- Follow-up telephone calls: Two weeks after the postcard mailing, the survey contractor will begin follow-up telephone calls to nonrespondents to remind them to complete the survey. These calls will be made at three different points during the data collection period. During the follow-up calls, interviewers will offer to send a replacement questionnaire and will inquire if the respondent would like to complete the survey over the telephone. Also, establishments that have not previously completed the respondent identification telephone call will be screened for eligibility. Establishments that refuse to participate in the survey will be contacted by a member of the contractor's project team, and a refusal conversion will be attempted. A script of this telephone call is provided in Appendix 5.
- Remailing of survey packet: Seven weeks after the original mailing, the survey contractor will resend the survey (via Federal Express or e-mail) to all nonrespondents and indicate a cutoff date for completing the survey. The final set of follow-up telephone calls will be made approximately 1 week after the remailing.
- Toll-free survey help line and e-mail address: During the data collection period, the survey contractor will operate a toll-free survey help line and provide an e-mail address that respondents can contact to request assistance when completing the survey.

### **B.3 Methods to Maximize Response Rates and Deal with Nonresponse**

Achieving a high response rate is important to minimizing nonresponse bias. The data collection procedures employed by the contractor will be designed to maximize the response rate, including the following activities:

- working with industry (for example, by meeting with trade associations) to secure their support of the survey;
- securing establishment “buy-in” through clear and effective explanation of the importance of the study;
- developing rapport and trust through effective and consistent messages conveyed from telephone interviewers to the individual respondents;
- using a variety of methods and communication modalities to convey the importance of the study, including a cover letter on FSIS letterhead, brochures, postcards, emails, and telephone calls;
- developing a carefully designed and thoroughly tested survey instrument;
- using highly trained individuals, outfitted with the most effective technological tools, to gain cooperation and minimize refusals in a timely and efficient manner;
- operating a toll-free survey help line and an e-mail address that respondents can contact to request assistance when completing the survey; and
- ensuring the utmost confidence in the data security and privacy procedures in place by the survey contractor.

These same procedures were employed for the first round of surveys and yielded response rates of 75% or higher for most industry segments. Consistent with the first round of surveys, a nonresponse bias analysis will be conducted.

#### **B.4 Tests of Procedures and Methods to Be Undertaken**

RTI conducted pretest interviews with three individuals from meat slaughter establishments representing different sizes of establishments and species (cattle, swine). FSIS recruited eligible establishments, and RTI scheduled and conducted telephone interviews to pretest the survey instrument. The purpose of the interviews was to evaluate participants’ comprehension and interpretation of the survey questions and to identify unclear terminology, ambiguous phrasing, and inappropriate (or missing) multiple-choice response options.

Participants were sent a copy of the survey instrument to complete before participating in the telephone interview. During the telephone interview, RTI recorded participants’ responses, probed for areas of difficulty, and asked a series of debriefing questions to assess participants’ overall understanding of the survey questions.

Overall the survey instrument was well received and understood. Changes made to the survey instrument included adding skip patterns where needed, adding instruction boxes for some questions or clarifying question instructions, adding definitions for some terms, and

changing the order of some response options. Some pretest participants expressed concern about the need for some questions and found some questions confusing. These questions were either revised or deleted from the survey instrument.

## **B.5 Individuals Consulted on Statistical Aspects and Individuals Collecting and/or Analyzing Data**

The contractor will collect the information and analyze the data on behalf of FSIS. Mr. Peter H. Siegel (919-541-6348) of RTI International developed the sample design and estimation procedures.

### **REFERENCES**

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