

Food Safety and Inspection Service's Annual Sampling Program Plan

Fiscal Year 2018

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Introduction

The U.S. Department of Agriculture's (USDA) Food Safety and Inspection Service (FSIS) inspects meat, poultry, and processed egg products to ensure that the food produced is safe, wholesome, and properly labeled. Verification activities serve to protect the public from foodborne hazards. A key FSIS inspection verification activity is the sampling of product for microbiological contaminants or chemical residues.

The report begins by describing FSIS' various sampling programs, and then highlights, by sampling program, the major accomplishments during the 2017 fiscal year (FY) and the changes that are planned for FY18. That narrative is followed by appendices containing tables which summarize the number of samples collected for microbiological (Appendix A), residue (Appendix B), and other (Appendix C) testing. Appendix D presents tables summarizing the number of tests and analytes FSIS screens for in the different sampling programs.

Sampling Plans

FSIS released the *Report on the Food Safety and Inspection Service Microbiological and Residue Sampling Programs* in December 2011, which identified all of FSIS' sampling programs and discussed the statistical and policy basis for the programs.¹ FSIS has released a new sampling plan for each subsequent fiscal year (FY).² These sampling plans continued FSIS' efforts to comprehensively identify the Agency's microbiological and chemical residue sampling activities and consider them in light of data-driven strategic planning efforts, and are aligned with the Agency's Strategic and Annual Plan priorities. The sampling plans also described FSIS' major activities related to microbiological and chemical residue sampling, collectively known as analytes,³ in domestic establishments, imports, and in-commerce facilities during the fiscal year, and the Agency's overall strategy for directing its sampling resources for the following year.

This new FY2018 sampling plan seeks to accomplish the same goals by describing both FSIS' major activities related to sampling in FY2017, as well identifying the Agency's overall strategy

¹ Please see the following website for more information: http://www.fsis.usda.gov/wps/wcm/connect/0816b926-c7ee-4c24-9222-34ac674ec047/FSIS_Sampling_Programs_Report.pdf?MOD=AJPERES

² To review past Annual sampling plans, please see the following website for more information: <http://www.fsis.usda.gov/wps/portal/fsis/topics/data-collection-and-reports/fsis-data-analysis-and-reporting/data-reporting>

³ The term analyte refers to the target of detection in the analysis, whether it is for microbiological pathogens, chemical residues, pathology diagnoses or other various analyses.

for directing its sampling resources in FY2018.

Background

FSIS Agency Planning

FSIS published a strategic plan for FY2017-2021 in FY2017, which aims to strengthen FSIS sampling programs.⁴ FSIS is focusing its sampling efforts, in part, through using strategic plan measures to: i) ensure establishments are meeting pathogen reduction performance standards, ii) increase the percentage of country/product combinations from equivalent countries tested, and iii) increase the percentage of products from domestic establishments that are sampled. In addition, in FY2018 FSIS will complete an evaluation of data collected through questionnaires in PHIS (sampling, inspection, and enforcement) forms to improve FSIS questionnaire consistency, data quality, standardization, and targeting, as well as to better use FSIS field inspector time and resources on sampling collection.

The activities in this FY2018 Sampling Plan also directly align with those in FSIS' FY2018 Annual Plan, which further delineate FSIS' specific priorities. In addition, to support planning, analysis, and future decision-making related to sampling, FSIS will conduct an internal evaluation this year to assess its past allocation and use of domestic and import sampling resources to ensure that the Agency, going forward, establishes criteria to allocate and use its sampling and inspection resources as effectively as possible. FSIS will use the evaluation results to modify future annual sampling plans as needed, help FSIS better manage sampling resources, as well as inform resource allocation, close sampling gaps, and maximize the public health benefit through prioritizing testing by degree of hazard.

FSIS Sampling Scheduling, Collection, and Analysis

The Agency's process of scheduling, collecting, and analyzing routine domestic samples typically begins with a sampling task assigned to FSIS inspection program personnel (IPP) through the Agency's Public Health Information System (PHIS). The IPP then collect and ship the samples collected to one of three FSIS testing laboratories, where the sample is tested for specified analytes. For imported product, the type of inspection verification PHIS assigns to the received product informs IPP when samples are to be collected and sent for laboratory analysis.

The FSIS laboratories perform different tests depending on the sampling project for which the

⁴ Please see the following website for more information on the FY2017-2021 FSIS Strategic Plan: <http://www.fsis.usda.gov/wps/wcm/connect/317d14d6-1759-448e-941a-de3cbff289e5/Strategic-Plan-2017-2021.pdf?MOD=AJPERES>

sample was collected. Some sampling projects are considered routine, while others are triggered by positive test results from other projects or events and, as such, are not considered routine.

Tables in Appendix A-C contain the following information:

1. Number of samples which were planned to be analyzed in FY2017;⁵
2. Number of samples actually analyzed in FY2017; and
3. Number of samples which are planned to be analyzed in FY2018.

Tables in Appendix D contain the following information:

1. Number of analyses and analytes that were planned for FY2016, FY2017 and FY2018; and
2. The difference between FY2017 and FY2018 analyses and analytes.

Totals in the individual tables have been rounded. The FY2018 sampling plan is based on the number of samples anticipated to be analyzed instead of to be scheduled. Operational abilities allow FSIS to adjust the number of samples scheduled on a monthly basis to better target the number of samples collected and analyzed.⁶

The estimates for each sampling project are based on current plans, FSIS policies, and industry practices and, therefore, are subject to change over the course of the fiscal year. In FY2017, FSIS performed a review of the sampling projects to determine if the number of planned samples consistently meets the number of analyzed samples. The review included the previous three years of planned versus actual sample numbers, and FSIS reduced the planned number of samples for FY2018 according to the results of this analysis. Narrative is included to describe significant changes to sampling programs or projects that occurred in FY2017 and what changes are planned for FY2018.

Finally, it is important to note there may be a difference between the number of samples that are anticipated to be analyzed and the total number of samples actually analyzed within the

⁵ The total number of samples planned to be scheduled in FY2017 was included in the *FSIS Annual Sampling Program Plan, Fiscal Year 2016*.

⁶ FSIS targets the number of samples collected on an annual basis instead of focusing on specific collection rates as not all establishments currently being sampled under FSIS sampling projects produce every eligible product every day. In order to collect samples from infrequent producers and optimize the total number of samples collected and analyzed, FSIS adjusts the number of samples being scheduled based on the average number of samples collected throughout the sampling year.

Fiscal Year period. Some of the challenges IPP face when trying to collect all of the samples accounted for in the sampling plan are the availability of eligible products and the resources available to the Office of Field Operations (OFO); some sampling tasks may not be completed because of other inspection priorities. Other potential reasons for discrepancies include improvements made to the sampling frame throughout the year which correct for lower sampling volumes, product availability at the establishment level, and other unforeseen circumstances.

General FY2017 Accomplishments

During FY 2017, FSIS continued to close existing sampling gaps by implementing programs in several different areas. These programs include exploratory sampling for Religious Exempt and Low Volume poultry establishments, residue testing on new subclasses for bulls/stags and veal other than bob veal, as well as exploratory sampling for imported raw pork product. In addition to the expanded sampling, FSIS designed a baseline study which was implemented in June 2017 based off the data collected during Phase I of the Raw Pork Product Exploratory Sampling Program (RPPESP).

FSIS implemented a pilot project in support of the National Action Plan for Combating Antibiotic Resistant Bacteria (CARB) and the USDA Antimicrobial Resistance (AMR) Action Plan. This project is an effort to link NARMS sampling data with associated residue information from the same animal (dairy cow) or flock (young chicken).

In September 2017, FSIS moved out of its transitional testing for Siluriformes. With this move, the Agency expanded sampling to include RTE Siluriformes products for both domestic and imported product. These samples were included in the normal RTE sample workflow. The number of samples to be analyzed has also increased for both domestic and import sampling. This will allow for FSIS to expand testing to more domestic establishments and to more product/country pairings for imported products.

In FY 2017, FSIS expanded its Whole Genome Sequencing (WGS) capability to all three FSIS Field Service Laboratories, greatly increasing the number of isolates the Agency has the capacity potential for FSIS to sequence. FSIS committed in its FY2017 Annual Plan to performing WGS on 100% of bacterial isolates from FSIS regulatory sampling programs. The Agency met this goal and has performed WGS on over 7,000 isolates, including FSIS regulatory sampling program isolates and *Salmonella* and *Campylobacter* isolates from the NARMS Cecal

Project. Additionally, FSIS has performed WGS on those *Escherichia coli* and *Enterococcus* spp. isolates from the NARMS cecal samples with a defined antimicrobial resistance phenotype, resulting in an expanded look at genotypes possible.

FSIS, in consultation with appropriate stakeholders, will also explore how to broaden the application for WGS in our regulatory framework and develop an action plan. In the short term, the agency plans to continue to use WGS to better understand *Lm* harborage in regulated establishments producing RTE products. In addition, FSIS plans to work with FDA and other partners to develop specific procedures for sharing WGS information involving dual jurisdiction establishments.

Overview

The table below acts as a quick reference guide of the microbiological analytes by various FSIS regulated products in FY2018. For a more in-depth review, the tables in the “Sampling by Product” section contain the stratification of the different analytes by product classes.

Table 1

Product	Microbiological Analyte					
	<i>Salmonella</i>	<i>Campylobacter</i>	<i>L. monocytogenes</i>	<i>E. coli</i> O157:H7	Non-O157 STEC	Indicator Organisms
Raw Beef	√			√	√ ¹	
Raw Pork	√			√	√	√
Raw Siluriformes	√					
Raw Poultry	√	√				√ ²
RTE Product	√		√			
Eggs – Processed	√		√			

¹ Only domestic raw beef manufacturing trim and imported raw beef trim and other ground beef components have Non-O157 STEC testing. All other raw beef products are tested for *Salmonella* and *E.coli* O157:h7 only.

² Dependent upon the program as not all poultry projects are analyzed for indicator organisms.

Salmonella and *Campylobacter*

In raw poultry products, FSIS analyzes young chicken and turkey carcasses, comminuted⁷ chicken and turkey, and chicken part samples for *Salmonella* and *Campylobacter*. For raw beef products,

⁷ Comminuted is defined as a product “that has been ground, mechanically separated, or hand- or mechanically deboned and further chopped, flaked, minced or otherwise processed to reduce particle size” as per 9 CFR 417.

FSIS analyzes raw ground beef, and bench and manufacturing trim samples, as well as samples of components for raw ground beef, for *Salmonella*. In addition, FSIS analyzes raw fish, ready-to-eat⁸ meat, processed egg product, and poultry product samples for *Salmonella*.

***Salmonella* and *Campylobacter* Sampling Projects FY2017 Key Activities**

1. FSIS implemented follow-up sampling of chicken and turkey carcasses for *Salmonella*.
2. FSIS implemented other raw chicken parts sampling in November 2016.
3. The Agency also implemented sampling on religious exempt and low volume poultry establishments in the beginning of Quarter 4 of FY2017.
4. Pork sampling progressed from Phase I exploratory to Phase II baseline. Intact/non-intact – Other product categories were excluded from the baseline.

No changes have been planned at this time for FY2018

***E. coli* O157:H7 and non-O157 Shiga toxin-producing *E. coli* (STEC)**

FSIS conducts STEC sampling projects for product produced in domestic establishments, imported products, and raw ground beef in retail. FSIS tests for *E. coli* O157:H7 in samples of raw non-intact ground beef products and raw beef intended for raw non-intact products, including ground beef, raw ground beef components, and beef trimmings. “Beef manufacturing trimmings” are trimmings produced from cattle slaughtered onsite. “Bench trim” is trim derived from cattle not slaughtered onsite (i.e., purchased product).⁹ In addition to *E. coli* O157:H7, non-O157 STEC with the following six O-antigen groups are considered adulterants in raw beef used for production of non-intact beef products and include the *stx* and *eae* gens and one of the following O-antigen groups: O26, O45, O103, O111, O121, and O145.

Changes Planned to *E. coli* O157:H7 and non-O157 Shiga toxin-producing *E. coli* (STEC) Sampling Projects for FY2018

1. FSIS intends to expand its routine verification testing for the six non-O157 Shiga toxin-producing *Escherichia coli* (STEC) to include raw ground beef components other than raw

⁸ RTE products also receive *Lm* testing under the RTEPROD projects. See RTE section below for more information.

⁹ “Beef manufacturing trimmings” are trimmings produced from cattle slaughtered onsite. “Bench trim” is trim derived from cattle not slaughtered onsite (i.e., purchased product).

beef manufacturing trimmings produced at slaughter establishments. Therefore, FSIS intends to expand this analysis to include head meat, cheek meat, weasand (esophagus) meat, and product from advanced meat recovery (AMR), and heart meat.

Ready To Eat (RTE): *Listeria monocytogenes* (Lm) and *Salmonella*

FSIS conducts microbiological testing of RTE meat and poultry products for *Lm* and *Salmonella* in both domestically produced and imported RTE and egg products.

Routine RTE product sampling is scheduled every month under both a random sampling project and risk-based sampling project. Under the Risk-based *Listeria monocytogenes* (RLm) sampling program, establishments producing post lethality exposed RTE product are scheduled on a rotating basis, and samples of product, contact surfaces, and the processing environment are collected and tested for *Lm*. Intensified Verification Testing (IVT) is carried out whenever an establishment has a positive sample collected under the RLm sampling program or either one of the routine RTE sampling projects.

RTE *Lm* and *Salmonella* Sampling Projects FY2017 Key Activities

1. FSIS reviewed and reallocated sampling between the RTEPROD_RISK and RTRPROD_RAND projects for an even split of sampling tasks versus weighting the majority of the sampling on the RTEPROD_RISK project.
2. FSIS reviewed and updated the sampling algorithms to shift sample collection focus, giving greater weight to product production alternatives, product type percent positive, and establishment size.

Changes Planned to RTE *Lm* and *Salmonella* Sampling Projects for FY2018

1. FSIS intends to further review and update the risk factors associated with the scheduling algorithm for the RTEPROD_RISK sampling projects as well as the product sampling priority list IPP use to select a product for RTEPROD_RISK sampling.
2. The changes to implementation of the PHRE reduced the number of RLm sampling events required. Additionally, FSIS completed its review of the scheduling methodology for the RLm sampling project and intends to issue instructions in FY18 for using a new risk-based approach to prioritize PHREs at establishments eligible for RLm sampling.

3. FSIS will expand Siluriformes testing to RTE products and incorporate Siluriformes into the RTEPROD_RAND project.

Chemical Residues

FSIS conducts sampling for chemical residues in regulated meat, poultry, and egg products. Domestic sampling projects are summarized in Appendix B Table B1.

Chemical Residue Sampling Programs FY2017 Key Activities

1. FSIS implemented Tier 2 residue testing for bulls/stags and veal classes other than bob veal.
2. FSIS concluded the special residue study on old-breeder turkeys.

Changes Planned to Chemical Residue Sampling Programs for FY2018

1. FSIS plans to increase the number of samples allocated to veal other than bob veal by 25%.
2. FSIS intends to increase the number of samples analyzed for pesticides by approximately 25% for beef cows, dairy cows, steers, heifers, market hogs, sows, young chicken, and young turkey.
3. FSIS intends to increase the number of samples analyzed for hormones by approximately 25% for beef cows and dairy cows.
4. FSIS plans to add Tier 3 sampling for pesticide testing in feral swine.
5. FSIS intends to analyze Carbadox in liver tissue for Roaster Swine.
6. FSIS intends to remove analysis for Trace Metals in all products except Siluriformes.
7. FSIS intends to conduct a Dioxin survey of beef, poultry and pork products.
8. FSIS is currently validating a multi-residue method for egg products and anticipates the sampling of egg products in the latter part of FY 2018.

Exploratory and Baseline Studies

FSIS conducts exploratory and baseline studies to estimate the national prevalence of pathogens (i.e., bacteria of public health concern), indicator bacteria, or both. Typically each baseline or exploratory study, FSIS samples a specific species, type of animal or product, and, at the end of the sampling, prepares a report summarizing and compiling the results. FSIS uses the data from those studies when it decides whether to develop routine sampling programs for the species or product and, if so, how such a project should be structured.

Exploratory and Baseline Studies FY2017 Key Activities

1. FSIS implemented Phase II of its Raw Pork Products Exploratory Sampling Program (RPPESP). Phase II baseline sampling for *Salmonella*, *STECs*, and other analytes consisted of collecting samples of comminuted, intact, and non-intact raw pork products and analyzing them for *Salmonella*, *Campylobacter*, and other analytes.
2. FSIS published a report with the findings from the Nationwide Beef and Veal Carcass Microbiological Baseline Data collection Program.
3. FSIS implemented *Salmonella* testing of imported raw pork product samples.
4. FSIS implemented exploratory *Salmonella*, *Campylobacter* and indicator organism sampling in religious exempt and low volume poultry establishments.

Changes Planned for the Exploratory and Baseline Studies in FY2018

1. The RPPESP Phase II baseline will conclude in May 2018.

Import Sampling Programs

FSIS conducts sampling on imported products for microbiological, chemical, and pathology analytes. Information for the various projects can be found under their respective product classes in the table appendix.

Import Sampling Programs FY2017 Key Activities

1. FSIS added sampling of Imported Raw Pork products in January 2017.
2. FSIS increased sampling re-inspection task levels of beef products from Brazil, Ireland, France and the Netherlands
3. FSIS increased the sampling re-inspection task level of boneless beef manufactured trimmings for products from Uruguay.
4. FSIS monitored and adjusted sampling projects to account for the increased shipments and new/reinstated countries and products.

Changes Planned for Import Sampling Programs in FY2018

1. FSIS intends to start normal routine import sampling of Siluriformes from all countries exporting to the US

2. FSIS intends to add nitrofurans analysis for imported fresh chicken and fresh turkey products.
3. FSIS intends to add avermectin analysis for imported processed goat products.

Other Sampling Programs

FSIS also samples domestically-produced and imported products through the following FSIS projects¹⁰:

1. Advanced Meat Recovery (AMR) - FSIS tests beef product from AMR processes to verify that industry is preventing spinal cord material from entering the food supply and being misrepresented as meat.
2. NARMS (National Antimicrobial Resistance Monitoring System)¹¹– FSIS participates in NARMS, a national public health surveillance system that tracks antibiotic resistance in foodborne bacteria. NARMS monitors antimicrobial resistance among enteric bacteria from humans, retail meats, and food animals. The major bacteria currently under surveillance are *Salmonella*, *Campylobacter*, *E. coli*, and *Enterococcus*.
3. NARMS and Residue Pilot program (RESNARMS) – As part of a paired sampling task, FSIS collects tissues for residue analysis from the same dairy cow or chicken flock from which a NARMS cecal sample was collected.
4. Foodborne Illness and Outbreak Sampling – FSIS collects and analyzes food samples potentially related to human illness outbreaks. When a sample test positive, analyses of the isolate include both culture and characterization methods, such as PFGE, antimicrobial susceptibility testing, molecular serotyping, and WGS.
5. Food Chemistry – FSIS performs other food chemistry analyses, such as moisture, protein, and fat analyses. FSIS also tests for the presence of food additives to

¹⁰ The USDA Animal and Plant Health Inspection Service (APHIS) conducts an ongoing surveillance program for bovine spongiform encephalopathy (BSE), in which) approximately 25,000 animals are sampled each year. Under the program, either APHIS or FSIS collect samples from the cattle populations where the disease is most likely to be detected, similar to the enhanced surveillance program procedures. Laboratory analysis of collected samples is handled exclusively by APHIS. For more information about FSIS' role in sample collection for BSE, please see FSIS Directive 10,400.1, <http://www.fsis.usda.gov/wps/wcm/connect/09bf6ed8-1e4b-4ef5-a3e1-fa454b116b8e/10400.1.pdf?MOD=AJPERES>.

¹¹ Additional data for NARMS can be found at the following CDC website: <http://www.cdc.gov/narms/reports/>
FDA website:
<http://www.fda.gov/AnimalVeterinary/SafetyHealth/AntimicrobialResistance/NationalAntimicrobialResistanceMonitoringSystem/default.htm>

USDA website:
<https://www.fsis.usda.gov/wps/portal/fsis/topics/data-collection-and-reports/microbiology/antimicrobial-resistance/narms>

identify mislabeling, economic fraud, and adulteration of meat, poultry, and egg products.

6. Species Identification – FSIS conducts species verification on both imported and domestic samples.
7. Pathology - FSIS conducts diagnostic and consultative pathology services to identify diseases, parasites, and related conditions in response to the needs of field operations.
8. Compliance Testing - FSIS investigators collect compliance samples at in-commerce businesses on a “for-cause” basis in response to complaints, allegations, and their own observations during routine or for-cause surveillance activities.

Other Sampling Programs FY2017 Key Activities

1. FSIS created a stand-alone Nutritional Labeling exploratory program. For this program samples were collected in their final packaging if they contained a Nutritional Facts panel and were analyzed for fat and sodium content.
2. FSIS implemented an antibiotic residue testing program to complement the NARMS program sampling project, as described above.

Changes Planned for Other Sampling Programs in FY 2018

1. FSIS is considering implementing additional label verification testing for antibiotics, soy and/or hormones.

Other Proposed Projects

These are projects under consideration by FSIS. Sampling through these projects may occur by FSIS or other coordinating Agencies.

1. FSIS is considering developing a pilot program for *Salmonella* from food contact surfaces.
2. FSIS is considering developing a surface sampling (cloth or sponge) method pilot program with ARS for beef components and trimmings.

Appendix A: Microbial Sampling Numbers by Product

This appendix summarizes the numbers of samples in FSIS' microbiological sampling program, and presents the number of samples planned and actually analyzed in FY17, and the number of samples planned to be analyzed in FY18, by product type. Raw products are presented first, beginning with beef (Table A1), followed by pork (Table A2), fish of the order Siluriformes (Table A3) and Poultry (Table A4). Ready-to-eat, not-ready-to-eat and egg product sampling numbers are presented in Table A5.

Table A1: FY17 and FY18 Sample Numbers for Raw Beef

Product Class	Sampling Project	Pathogen(s)	Number of Samples FY2017		Number of Samples FY2018
			Planned	Actual	Planned
Raw ground beef	MT43	<i>E. coli</i> O157:H7 and <i>Salmonella</i>	12,500	11,110	11,500
Follow-Up testing to a ground beef <i>E. coli</i> positive ¹	MT44 and MT44T	<i>E. coli</i> O157:H7 and <i>Salmonella</i>	TBD	169	TBD
Raw ground beef components other than trim	MT64	<i>E. coli</i> O157:H7, Non-O157 STEC and <i>Salmonella</i>	1,000	561	600
Bench trim	MT65	<i>E. coli</i> O157:H7 and <i>Salmonella</i>	2,000	1,153	1,500
Beef manufacturing trim	MT60	<i>E. coli</i> O157:H7, Non-O157 STEC and <i>Salmonella</i>	4,500	3,566	3,750
Follow-up testing at supplier establishments following MT43, MT44, or MT65 positive ¹	MT52	<i>E. coli</i> O157:H7, Non-O157 STEC and <i>Salmonella</i>	TBD	154	TBD
Follow-up testing to an MT60, MT64, MT65, or MT52 positive ¹	MT53	<i>E. coli</i> O157:H7, Non-O157 STEC and <i>Salmonella</i>	TBD	677	TBD
Raw ground beef at retail stores	MT05	<i>E. coli</i> O157:H7 and <i>Salmonella</i>	560	574	575
Follow-up testing to a MT05 sample ¹	MT06	<i>E. coli</i> O157:H7 and <i>Salmonella</i>	TBD	3	TBD
Imported raw ground beef ³	MT08	<i>E. coli</i> O157:H7 and <i>Salmonella</i>	25	37	50
Imported trim and other raw ground beef components	MT51	<i>E. coli</i> O157:H7, Non-O157 STEC and <i>Salmonella</i>	900	1,697 ²	2,000

¹ Dependent on positive findings from other *E. coli* O157:H7 or non-O157 STEC sampling projects.

² Lab sampling for Imports depends on the import frequency for these products.

Table A2: FY17 and FY18 Sample Numbers for Raw Pork

Product Class	Sampling Project	Pathogen(s)	Number of Samples FY2017		Number of Samples FY2018
			Planned	Actual	Planned
Comminuted Pork Exploratory Sampling ¹	EXP_PK_COM02	<i>Salmonella</i> and Non-O157 STEC and Indicator Organisms	1,700	1,512	1,120
Intact Pork Cuts Exploratory Sampling ¹	EXP_PK_ICT02	<i>Salmonella</i> and Non-O157 STEC and Indicator Organisms	1,400	1,100	840
Intact Other Pork Exploratory Sampling ¹	EXP_PK_IOT01	<i>Salmonella</i> and Indicator Organisms	0	344	0
Non- Intact Pork Cuts Exploratory Sampling ¹	EXP_PK_NCT02	<i>Salmonella</i> and Non-O157 STEC and Indicator Organisms	1,400	603	840
Non-Intact Other Pork Exploratory Sampling ¹	EXP_PK_NOT01	<i>Salmonella</i> and Indicator Organisms	0	171	0
Imported Pork	IMP_PORK	<i>Salmonella</i>	770	326	1,000

¹ Phase II baseline for Raw Pork began in June 2017. Sampling occurred previously under the EXP_PK_XXX01 projects. With Phase II, FSIS eliminated sampling for the Other Intact/Non-Intact Pork Products.

Table A3: FY17 and FY18 Sample Numbers for Raw Siluriformes

Product Class	Sampling Project	Analyses	Number of Samples FY2017		Number of Samples FY2018
			Planned	Actual	Planned
Domestic Raw fish of the order Siluriformes	EXP_FI_MIC01	<i>Salmonella</i>	200	190	650
Imported Raw fish of the order Siluriformes ¹	IMPFISH_MI	<i>Salmonella</i>	100	211 ²	1,800

¹ FSIS will ramp up sampling of Imported Siluriformes projects beginning in Quarter 2 of FY 2018.

² Lab sampling for imported Siluriformes depends on the frequency in which these products are imported, a higher number of shipments were received for these products.

Table A4: FY17 and FY18 Sample Numbers for Raw Poultry

Product Class	Sampling Project	Pathogen(s)	Number of Samples FY2017		Number of Samples FY2018
			Planned	Actual	Planned
Young Chicken Carcasses	HC_CH_CARC01	<i>Salmonella</i> , <i>Campylobacter</i> and Indicator Organisms ⁴	12,000	9,068 ⁵	10,000
Ground and Other Comminuted Chicken (not Mechanically Separated)	HC_CH_COM01	<i>Salmonella</i> , <i>Campylobacter</i> and Indicator Organisms ⁴	4,000	1,454 ⁵	2,500
Exploratory - Mechanically Separated Chicken	EXP_CH_MSK01	<i>Salmonella</i> , <i>Campylobacter</i> and Indicator Organisms ⁴	150	112	150
Chicken Parts – Legs, Breasts, Wings	HC_CPT_LBW01	<i>Salmonella</i> , <i>Campylobacter</i> and Indicator Organisms ⁴	8,000	7,633	8,000
Chicken Parts – Other Parts ¹	EXP_CPT_OT01	<i>Salmonella</i> , <i>Campylobacter</i> and Indicator Organisms ⁴	NA	243	360
Chicken Parts – Quarters, Halves ¹	EXP_CPT_QH01	<i>Salmonella</i> , <i>Campylobacter</i> and Indicator Organisms ⁴	NA	93	120
Turkey Carcasses	HC_TU_CARC01	<i>Salmonella</i> , <i>Campylobacter</i> and Indicator Organisms ⁶	2,500	1,890 ⁵	2,000
Ground and Other Comminuted Turkey (not Mechanically Separated)	HC_TU_COM01	<i>Salmonella</i> , <i>Campylobacter</i> and Indicator Organisms ⁴	1,500	999 ⁵	1,500
Exploratory - Mechanically Separated Turkey	EXP_TU_MSK01	<i>Salmonella</i> , <i>Campylobacter</i> and Indicator Organisms ⁴	150	104	150
Imported Raw Intact Chicken and Turkey	IMP_POULTRY	<i>Salmonella</i> , <i>Campylobacter</i> and Indicator Organisms ⁴	800	596	1,000
Religious exempt establishments ²	RE_CH_CARC01	<i>Salmonella</i> , <i>Campylobacter</i> and Indicator Organisms	NA	6	6,600

Product Class	Sampling Project	Pathogen(s)	Number of Samples FY2017		Number of Samples FY2018
			Planned	Actual	Planned
Low Volume Establishments ²	LO_CH_CARC01	<i>Salmonella</i> , <i>Campylobacter</i> and Indicator Organisms	NA	204	
	LO_TU_CARC01				
	LO_CH_COM01				
	LO_TU_COM01				
	LO_CH_MSK01				
	LO_TU_MSK01				
	LO_CPT_LBW01				
	LO_CPT_OT01				
	LO_CPT_QH01				
Follow-up Sampling for Chicken Parts, Carcasses, Comminuted Chicken and Turkey ³	F_CPT_LBW01	<i>Salmonella</i> , <i>Campylobacter</i> and Indicator Organisms ⁴	TBD	650	TBD
	F_CH_COM01				
	F_TU_COM01				
	F_CH_CARC01				
	F_TU_CARC01				

¹ FSIS began sampling other chicken parts along with quarters/halves in FY2017.

² Religious exempt and low volume poultry establishments began sampling in July 2017.

³ Dependent on findings from other *Salmonella* and *Campylobacter* projects.

⁴ Indicator Organisms are not currently performed on these projects. However during FY2018, FSIS may plan to extend analysis to Indicator Organisms for these projects. This extension would not happen all at once, but rolled out over a period of time.

Table A5: FY17 and FY18 Sample Numbers for RTE, NRTE and Egg Products

Product Class	Sampling Project	Pathogen(s)	Number of Samples FY2017		Number of Samples FY2018
			Planned	Actual	Planned
Both post lethality-exposed and non-post lethality-exposed RTE products	RTEPROD_Rand	<i>Lm</i> & <i>Salmonella</i>	4,400	6,831	7,400
Post lethality-exposed RTE products	RTEPROD_Risk	<i>Lm</i> & <i>Salmonella</i>	10,400	7,667	7,400
RLm product samples (Composited 5-sample Units)	RLMPRODC	<i>Lm</i>	690	156 ³	115
RLm food contact surface samples	RLMCONT	<i>Lm</i>	6,880	2,614 ³	1,150
RLm non-food contact environmental samples (Composited 5-sample Units)	RLMENVC	<i>Lm</i>	690	164 ³	115

Product Class	Sampling Project	Pathogen(s)	Number of Samples FY2017		Number of Samples FY2018
			Planned	Actual	Planned
Intensified Verification Testing (IVT) product samples ¹	INTPROD	<i>Lm or Salmonella</i>	TBD	190	TBD
IVT food contact surface samples ¹	INTCONT	<i>Lm or Salmonella</i>	TBD	541	TBD
IVT non-food contact environmental samples ¹	INTENV	<i>Lm or Salmonella</i>	TBD	268	TBD
Imported intact RTE product	IMVRTE	<i>Lm & Salmonella</i>	2,200	2,961	3,000
Follow up testing to imported RTE product	FLISTERIA	<i>Lm</i>	TBD	53	TBD
Follow up testing to imported RTE product	FRTESALMONEL	<i>Salmonella</i>	TBD	15	TBD
Processed Egg Products	EM31-EM37	<i>Lm & Salmonella</i>	1,600	1,690	1,600
Pasteurized imported liquid, frozen or dried egg products	EGGIMP	<i>Lm & Salmonella</i>	125	144	150

Abbreviations: NRTE, not-ready-to-eat; RTE, ready-to-eat.

¹ Dependent on positive findings from RTEPROD_RAND, RTEPROD_RISK, and RLm sampling projects

² NRTE Stuffed Chicken products did not begin in FY 2017 and should be implemented in FY 2018.

³ The changes to how the PHRE is evaluated reduced the number of sampling events required.

Appendix B: Chemical Residue Sampling Numbers by Product

This appendix summarizes the numbers of samples in FSIS' chemical residue sampling program for FY17 and FY18. Table B1 presents the number of samples by production class. Table B2 presents the testing method used in each production class.

Table B1: FY17 and FY18 Sample Numbers for Chemical Residues

Production Class	Sampling Project	Number of Samples FY2017		Number of Samples FY2018
		Planned	Actual	Planned
Beef Cows	NRP_BC	712	716	712
Bob Veal	NRP_BV	356	369	356
Dairy Cows	NRP_DC	712	795	712
Heifers	NRP_HF	356	349	356
Steer	NRP_ST	356	391	356
Market Swine	NRP_MS	712	731	712
Sows	NRP_SW	712	622	712
Young Chicken	NRP_YC	712	712	712
Young Turkey	NRP_YT	712	928	712
Sheep	NRP_SH	150	163	150
Goats	NRP_GO	150	337	300
Old Breeder Turkeys (Mature Turkeys)	NRP_OBT	100	38	0 ⁴
Roaster Swine	NRP_RS	300	216	300
National Residue Program State Residues ¹	Various	700	386	660
Bulls/Stags	NRP_BS	100	149	100
Veal other than bob veal	NRP_HC, NRP_FFV, NRP_NFFV	100	109	150
Feral Swine	NRP_FS	NA	NA	100
Siluriformes – Domestic	RES_FI	200	190	650
Siluriformes – Imports	IMPFISH_CH_E and IMPFISH_CH_W	100	433 ⁶	1,800
Dioxin Survey	DIOX_18_xx ⁵	NA	NA	610
KIS™ Test ²	KIS	NA	176,864	NA
KIS™ Test – Laboratory Confirmation ³	KIS	NA	3,945	NA
Collector Generated Residues	Various	NA	98	NA
Import Residue	Various	3,000	2,285	3,000

Abbreviations: KIS™, Kidney Inhibition Swab; NA, non-applicable.

¹ FSIS schedules in PHIS and analyzes 88 samples per year for states of the same species it tests at federally-inspected establishments.

² These KIS tests are performed by OFO in the field and not by the laboratories.

³ FSIS in-plant inspection personnel send positive KIS tests to FSIS laboratories for confirmation.

⁴ Old Breeder Turkeys (Mature Turkeys) were removed from Tier II testing.

⁵ FSIS will conduct the Dioxin survey on poultry (YC – young chicken; YT – young turkey), pork (MH – market hogs) and beef (STHR – steers and heifers) products. The “xx” indicated above will be replaced by the two letter identifier in the parenthesis for each product group of this note, or an alternate project code may be implemented, the ARS labs will be performing the analysis of these samples.

⁶ Lab sampling for imported Siluriformes depends on the frequency in which these products are imported, a higher number of shipments were received for these products and testing is doubled because lab sampling occurred for all analyses applicable.

Table B2: Chemical Residues Tested by Production Class

Methods	Tier 1: Production Class								Tier 2: Production Class				Tier 3			
	Beef Cows	Dairy Cows	Steers	Heifers	Bob Veal	Market Swine	Market Sows	Young Chicken	Young Turkey	Goats	Sheep	Non-Bob Veal	Roster Bull Swine	Feral Swine	Eggs	Siluriformes
Multi-class	√	√	√	√	√	√	√	√	√	√	√	√	√			√
Aminoglycoside	√	√	√	√	√	√	√	√	√			√	√			
Pesticides	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√
Metals																√
B-agonists	√	√	√	√	√	√						√				
Carbadox														√		
Hormones	√	√	√	√	√											
Avermectins	√	√	√	√	√	√	√			√	√					
Arsenic	√	√	√	√	√	√	√	√	√	√	√					
Nitrofurans								√	√							√
Antifungal Dyes																√

Appendix C: Other Sampling Programs

Table C1 in this appendix summarizes the numbers of samples in FSIS' sampling programs other than microbiological and chemical residue sampling programs for FY17 and FY18.

Table C1: FY17 and FY18 Sample Numbers for FSIS Sampling Programs other than Microbiological and Chemical Residues

Sampling Project	Sampling Project	Number of Samples FY2017		Number of Samples FY2018
		Planned	Actual	Planned
Domestic AMR - Beef ¹	AMR01	150	112	150
Import AMR – Beef ¹	IMPAMRBEEF	10	24	10
Follow-up AMR01 – Beef ^{1,2}	FAMR01	NA	10	NA
NARMS Sampling for Enteric Bacteria	NARMS	6,400	5,689	6,400
NARMS Sampling for Residues on Dairy Cows ¹¹	RESNARMS_DC	TBD	365	1,280
NARMS Sampling for Residues on Young Chickens ¹¹	RESNARMS_YC	TBD	278	768
Foodborne Illness and Outbreak Sampling ^{3,4}	Various	7,000	117	7,000
Label Verification for Nutrient Content - Raw Ground Beef ⁵	NUTR_GB and EXP_LV_NUTR	200	83 ¹¹	200
Label Verification - Allergens ⁶	EXP_LV_SOY	100	NA	200
Label Verification – Antibiotic Free ⁶	EXP_LV_ABX	200	NA	400
Label Verification – Hormone Free ⁶	EXP_LV_HORM	100	NA	200
Species Identification - Collector Generated	SPECID	NA	1	NA
Import Species Identification	IMPESPECIESID	250	192	250
Food Chemistry - Collector Generated ⁷	FOODCHEM	NA	1	NA
Compliance Testing ^{3,8}	COMPLIAN	NA	71	NA
Pathology - Collector Generated ^{3,9}	Various	NA	3,754	NA
Import - Abnormal Container	IMPABNCONT and ABNCONT	NA	16	NA

Abbreviations: AMR, advanced meat recovery; NARMS, National Antimicrobial Resistance Monitoring System. Monitoring Sampling.

¹ FSIS collects samples in regulated establishments to test for AMR processes to verify that industry is preventing beef spinal cord material from entering the food supply and being misrepresented as meat. If an AMR sample is positive, additional samples are assigned to the establishment in PHIS through the FAMR01 sampling. FSIS is considering expanding the beef AMR program to include calcium and iron.

² Dependent on positive findings from the AMR01 sampling project.

³ Samples for these projects are not planned in advance, but rather an inspector in the field can collect a sample on the basis of their findings or other circumstances. The planned samples for the Foodborne Illness and Outbreak Sampling is a baseline of 2,000 plus the follow-up sampling from projected numbers.

⁴ FSIS collects and analyzes food samples potentially related to human disease outbreaks. Analyses include cultural and molecular methods such as polymerase chain reaction (PCR), PFGE, antimicrobial susceptibility testing and molecular serotyping to identify and further characterize organisms in outbreak samples

⁵ FSIS changed over programs from an Exploratory to a Label Verification project. NUTR_GB is no longer running.

⁶ FSIS may bring on-line several other Label Verification programs in FY2018 which were originally scheduled to begin in FY2016.

⁷ FSIS performs food chemistry analyses such as moisture, protein, fat and testing for the presence of food additives to identify mislabeling, economic fraud, and adulteration of meat, poultry, and egg products

⁸ FSIS investigators collect compliance samples at in-commerce businesses on a “for-cause” basis in response to complaints, allegations, and their own observations during routine or for-cause surveillance activities.

⁹ FSIS carries out diagnostic and consultative pathology services to identify diseases, parasites and related conditions in response to the needs of field operations.

¹⁰ These projects gather data to determine if there is a link between antimicrobial resistance and drug use in animals.

¹¹ There are a low number of establishments eligible for this sampling based off their responses to the questionnaires, thus the number of samples that could be assigned was lower.

Appendix D: Planned Number of Tests and Analytes Tested for per Sample

FSIS continuously strives to improve sampling procedures and testing of the products collected. One way of increasing efficiency is by increasing the number of analytes assessed per sampling collection event. Table D1 and Table D2 summarize, for microbiological and chemical residue programs, respectively, the total planned number of analyses and corresponding planned number of analytes tested for during FY16, FY17 and FY18 by product class. Data is based on the proposed number of samples and which analyses were performed during that specific fiscal year. The term analyses (tests) refers to the method used on a sample, while the term analyte refers to each individual, reportable item tested for in the method. For example, one raw ground beef sample will be tested for *Salmonella*, *E.Coli* O157:H7 and Non-O157 STEC. This would result in 3 separate analyses for the sample. However, since the Non-O157 STEC method tests for 6 different species of *E.Coli*, the number of analytes tested would be 8, 6 from the STEC analysis, 1 from the *E.Coli* O157:H7 analysis and 1 from *Salmonella*.

Table D1: Total Planned Number of Microbiological Analyses and Analytes Reported by Year

Product Class	Planned for 2016		Planned for 2017		Planned for 2018		Difference (FY2018-FY2017)	
	Tests Performed	Analytes Reported	Tests Performed	Analytes Reported	Tests Performed	Analytes Reported	Tests Performed	Analytes Reported
Raw Beef	89,280	149,904	70,656	250,008	67,248	234,072	-3,408	-15,936
Raw Pork	3,600	10,800	15,840	58,080	9,432	31,896	-6,408 ²	-26,184 ²
Raw Poultry	32,328	32,328	102,768	171,816	105,228	175,380	2,460 ²	3,564 ²
Raw Siluriformes	300	300	300	300	2,460	2,460	2,160 ²	2,160 ²
RTE	34,032	34,032	34,032	34,032	35,616	35,616	0	-1,584
RLm	16,560	16,560	8,280	8,280	1,392	1,392	-6,888 ²	-6,888 ²
NRTE	0	0	4,416	4,416	1,980	1,980	-2,436 ²	-2,436 ²
Eggs	1,680	1,680	3,456	3,456	3,504	3,504	0	0
NARMS	10,800	10,800	6,408	6,408	6,408	6,408	0	0
Total¹	188,580	256,332	246,156	536,796	226,724	484,044	-14,520	-47,304

¹ The total number of tests performed and analytes do not include the test and analytes from further characterization testing performed on isolates.

² The differences between FY2017 and FY2018 plans include the following:

- In transitioning to a baseline project for raw pork, the number of samples requested was reduced in addition to the elimination of two of the projects. This change resulted in a reduced number of analyses to be performed for raw pork.
- Several new projects for religious exempt and low volume were implemented for raw poultry which will increase the number of analyses to be performed.
- Increased sampling for raw Siluriformes in FY2018 will increase the number of analyses to be performed.
- NRTE Stuffed Chicken project was not implemented in FY2017 so the number of samples needed was reduced thus the decrease for analyses.
- Reduction in the number of RLms being performed is in support of new risk based approach to conducting PHRE's at establishments eligible for RLms.

³ The overall number of samples and subsequently analyses planned for FY2018 was reduced after reviewing previous performance of all the sampling projects. Projects were adjusted to reflect more attainable goals.

Table D2: Total Planned Number of Chemical Residue Analyses and Analytes Reported by Year

Product Class	Planned for 2016		Planned for 2017		Planned for 2018		Difference (FY2018-FY2017)	
	Tests Performed	Analytes Reported	Tests Performed	Analytes Reported	Tests Performed	Analytes Reported	Tests Performed	Analytes Reported
Tier I								
Beef Cows	3,560	119,972	3,560	119,972	3,560	119,972	0	0
Bob Veal	1,780	59,986	1,780	59,986	1,780	59,986	0	0
Dairy Cows	3,560	119,972	3,560	119,972	3,560	119,972	0	0
Heifers	1,780	59,986	1,780	59,986	1,780	59,986	0	0
Steer	1,780	59,986	1,780	59,986	1,780	59,986	0	0
Sows	3,560	116,768	3,560	116,768	3,560	116,768	0	0
Market Swine	3,560	118,548	3,560	118,548	3,560	118,548	0	0
Young Chickens	2,492	116,056	2,492	116,056	2,492	116,056	0	0
Young Turkeys	2,492	116,056	2,492	116,056	2,492	116,056	0	0
Tier II								
Sheep	1,246	52,154	525	23,325	525	23,325	0	0
Goats	1,246	52,154	525	23,325	1050	46,650	525	23,325
Mature Turkeys	270	8,820	300	10,650	0	0	-300	-10,650
Roaster Swine	300	31,950	300	46,050	300	46,050	0	0
Bulls/Stags	0	0	400	15,550	400	15,550	0	0
Veal - Other	0	0	300	10,850	450	16,275	150	5,425
Tier III								
Siluriformes	1,500	44,250	1,500	44,250	12,500	368,750	11,000	324,500
Other								
State NRP ¹	-	-	-	-	-	-	-	-
Imports ¹	-	-	-	-	-	-	-	-
KIS	8,000	424,000	8,000	424,000	8,000	424,000	0	0
Total¹	39,900	1,036,150	37,014	1,485,330	48,389	1,827,930	11,375	342,600

¹The analyses for import and State testing are driven by In Plant and Import Personnel selection.