UNITED STATES
National Residue Program for Meat, Poultry, and Egg Products

2012 RESIDUE SAMPLE RESULTS

United States Department of Agriculture
Food Safety and Inspection Service
Office of Public Health Science

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[1] In May2013, FSIS implemented an Agency-wide reorganization – the change in titles and staff names reflect the time period post reorganization rather than the structure during this reporting period in 2012.

[2] FSIS consolidated 15 field districts into 10 in 2013.

FSIS would like to acknowledge the members of the Surveillance Advisory Team (SAT), which includes representatives from the Food and Drug Administration (FDA), the Centers for Disease Control and Prevention (CDC), the Environmental Protection Agency (EPA), the Animal and Plant Health Inspection Service (APHIS), the Agricultural Marketing Service (AMS), and the Agricultural Research Service (ARS) for their extensive contributions to the United States National Residue Program (NRP).

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EXECUTIVE SUMMARY

2012 United States National Residue Program Data

The 2012 United States National Residue Program for meat, poultry, and egg products (hereafter the NRP), an interagency chemical testing program administered by the Food Safety and Inspection Service (FSIS), examined food samples for the presence of several different chemical compounds, including veterinary drugs, pesticides, and metals. As described in detail for each chemical compound class within this book, these compounds have been selected because of their potential public health concern. All samples were analyzed at one of three FSIS International Standardization Organization 17025-accredited laboratories: the Eastern Laboratory in Athens, GA; the Midwestern Laboratory in St. Louis, MO; or the Western Laboratory in Alameda, CA.

The NRP domestic sampling program comprises scheduled sampling and inspector-generated sampling. This allows the detection of residues or contaminants in food at concentrations that could adversely affect human health. The levels at which violations occur (e.g., those above an established tolerance) are based on toxicological studies evaluating the potential human health risk from exposure to these residues or contaminants.

In anticipation of FSIS moving from a sampling system where production classes were paired with single methods to one where a single sample would be analyzed for more than 100 chemicals, FSIS modified the number of samples allocated to the scheduled sampling program. Beginning in January 2012, FSIS reduced the total number of samples from approximately 20,000 to about 6,400 samples, anticipating that the newer methods would enable FSIS to be more effective and efficient.

In total, across all NRP sampling programs, FSIS identified **1,199** residue violations in **951** unique animals in CY 2012. **Note**: A single animal may have multiple tissue violations.

Under the domestic scheduled sampling program, FSIS in-plant-personnel (IPP) collected **5,838** residue samples (5,513 from US federal plants, and 325 from US state plants)-, from which **17** residue violations were reported. This number represents 12 unique animal violations, accounting for less than 1 % of samples collected.

The drug violations from domestic scheduled samples were mostly antibiotics: Dihydrostreptomycin, Gentamycin Sulfate, Neomycin, Penicillin, Tilmicosin, Sulfamethazine, and Sulfadimethoxine, used to prevent or treat bacterial infections. Generally, drug residue violations result from an inadequate withdrawal time for the drugs to clear the animal's system.

Additionally, the domestic scheduled sampling program identified 26 samples

(again, less than 1 %) with non-violative positive residue levels (*compared with 155 samples in CY 2011*). By definition, a non-violative positive residue sample represents a sample where the residue level is detected below the established tolerance.

Under the inspector-generated sampling program, most samples are initially screened in-plant using either the Fast Antimicrobial Screening Test (FAST) kit, or the Kidney Inhibition Swab (KIS™) Test. Samples that screen positive are sent to the FSIS Midwestern Laboratory (ML) for confirmation or in some situations for the initial analysis. For an in-plant screening, the in-plant inspector selects a carcass for sampling based on professional judgment and public health criteria outlined in FSIS Directive 10,800.1, rev 1.

From the **214,654** samples screened using either KIS™ or FAST, **5,188** samples (4,967 KIS™, 221 FAST) were submitted to the ML for confirmation. The ML identified **1,166** residue tissue violations in **928** animals (*compared with 1,289 residue tissue violations in 1,010 animals in CY 2011*). The KIS™ Test screens resulted in the detection of **1,125** violative samples (96% of 1,166) and the FAST screens resulted in the identification of **41** violations (3.5% of 1,166). The remaining 1% of violations were identified through collector-generated samples, samples from show animals, and from the US States testing program.

Out of 1,166 violative samples analyzed under the inspector-generated program KIS™ or FAST, Penicillin accounted for the highest percentage of violative samples (270, or 23 %), followed by Neomycin (209, or 18%) and Desfuroylceftiofur Cysteine Disulfide (173, or 15%), *compared with Penicillin, Neomycin, and Sulfadimethoxine, respectively in CY 2011.*

Additionally, the FAST and KIS™ screens under the inspector-generated sampling program identified 1,352 samples with non-violative positive residue levels (*compared with 1,810 samples in CY 2011*).

In addition, FSIS plans and administers an import reinspection program as part of the NRP. After U.S. Customs and Border Protections and USDA/APHIS requirements are met, shipments imported into the United States must be reinspected by FSIS at an approved import inspection facility. FSIS inspectors carry out reinspection in approximately 117 official import plants. Of the 1,299 samples analyzed in 2012, **no violations** were detected.

FSIS continually strives to improve methods for reporting the NRP data. These reports are publicly available on the FSIS website. Interested parties may also contact the OPHS Science Staff at (202) 690-6409 for additional copies of the annual report.

ACRONYMS

ADRS – Animal Disposition Reporting System

AIIS – Automated Import Information System

AMDUCA – Animal Medicinal Drug Use Clarification Act

AMS – Agricultural Marketing Service

APHIS – Animal and Plant Health Inspection Service

ARS – Agricultural Research Service

CDC – Centers for Disease Control and Prevention

CHCs – Chlorinated hydrocarbons

COPs – Chlorinated organophosphates

COLLGEN – Collector-Generated Samples sent directly to the laboratory

CSI - Consumer Safety Inspector

DAIS – Data Analysis and Integration Staff

DCA – Desfuroylceftiofur Acetamide

DCCD – Desfuroylceftiofur Cysteine Disulfide

DW – FSIS Data Warehouse

FAST – Fast Antimicrobial Screening Test

FDA – U.S. Food and Drug Administration

FSIS – Food Safety and Inspection Service

FRN- Federal Register Notice

EPA – U.S. Environmental Protection Agency

HACCP – Hazard Analysis and Critical Control Point

IPP – Inspection Program Personnel

KIS™ Test – Kidney Inhibition Swab Test

LQAS - Laboratory Quality Assurance Staff

MRM – Multi-class Residue method(s)

NASS – National Agricultural Statistics Service

ND – Non-detect

NRP – National Residue Program

NSAID – Non-Steroidal Anti-inflammatory Drug

OCIO – Office of the Chief Information Officer

OFO – Office of Field Operations

OPHS – Office of Public Health Science

PBDE – Polybrominated diphenyl ethers

PCBs – Polychlorinated biphenyls

PHIS – Public Health Information System

PHV – Public Health Veterinarian

PPB – Parts per billion

PPM – Parts per million

RVIS – Residue Violation Information System

SAT – Surveillance Advisory Team

STATE – State or Government Agency Testing

SHOW – Show Animals

TOI – Type of Inspection

UMI – Unidentified Microbial Inhibitor

Introduction

The U.S. National Residue Program (NRP) for Meat, Poultry, and Egg Products, administered by the USDA- FSIS, is an interagency program designed to identify, rank and test for chemical contaminants in meat, poultry, and egg products. FSIS publishes the NRP's *Residue Sampling Plans* (traditionally known as the Blue Book) each year to provide information on the process of sampling meat, poultry, and egg products for chemical contaminants of public health concern. The Blue Book describes the sampling algorithms used to allocate over 6,000 annually scheduled residue samples collected from meat, poultry and egg products and tested for the presence of more than 100 chemical compounds.

The NRP requires the cooperation and collaboration of several agencies for its successful design and implementation. The FSIS, the EPA, and the Department of Health and Human Services' (HHS) FDA are the primary Federal agencies managing this program. The FDA, under the Federal Food, Drug, and Cosmetic Act, establishes tolerances for veterinary drugs, and action levels for food additives and environmental contaminants. The EPA, under the Federal Insecticide, Fungicide, and Rodenticide Act (as modified by the Food Quality Protection Act), establishes tolerance levels for registered pesticides. Title 21 Code of Federal Regulations (CFR) includes tolerance levels established by FDA; Title 40 CFR includes tolerance levels established by EPA.

Representatives from FSIS, FDA, EPA, the USDA Agricultural Research Service (ARS), the USDA Agricultural Marketing Service (AMS), and the HHS Centers for Disease Control and Prevention (CDC) collaborate to develop the scheduled sampling program. These agencies work together to create the annual sampling plans using prior NRP findings of chemical compounds in meat, poultry, and egg products, FDA veterinary drug inventories completed during on-farm visits, information from investigations, and pesticides and environmental contaminants of current importance to EPA. The agency representatives convene to identify the residues of public health concern in appropriate production classes, and evaluate FSIS laboratory capacity and analytical methods. FSIS publishes the finalized sampling plans in the annual Blue Book.

Chemical compounds tested in the program include approved and unapproved veterinary drugs, pesticides, and environmental compounds. The NRP is designed to: (1) provide a structured process for identifying and evaluating chemical compounds of concern in food animals; (2) analyze chemical compounds of concern; (3) report results; and, (4) identify the need for regulatory follow-up subsequent to the identification of violative levels of chemical residues.

FSIS administers this regulatory program under the Federal Meat Inspection Act (FMIA) (21 U.S.C. 601 et seq.), the Poultry Products Inspection Act (PPIA) (21 U.S.C. 453 et seq.), and the Egg Products Inspection Act (EPIA) (21 U.S.C. 1031 et seq.). The program is designed to protect the health and welfare of consumers by regulating the meat, poultry, and egg products produced in federally inspected plants and to prevent the distribution in commerce of any such products that are adulterated or misbranded.

FSIS has administered the NRP by collecting meat, poultry, and egg product samples and analyzing the samples for specific chemical compounds at FSIS laboratories since 1967 for meat and poultry and since 1995 for egg products. A violation occurs when an FSIS laboratory detects a chemical compound level in excess of an established tolerance or action level, or when a chemical compound without an established tolerance level is detected. FSIS informs the plant via certified letter, and, under best practices, the plant should notify the producer that an animal from that business has a violative chemical level. FSIS also shares the violation data with FDA, which has on-farm jurisdiction, and EPA. FDA and cooperating State agencies investigate producers linked to residue violations, and, if conditions leading to residue violations are not corrected, can enforce legal action.

Every week, FSIS posts a Residue Repeat Violator List on its website. The list identifies producers with more than 1 violation on a rolling 12-month basis. In addition, the list provides helpful information to processors and producers who are working to avoid illegal levels of residues, serves as a deterrent for violators, and enables FSIS and FDA to make better use of resources. Because FSIS updates this list weekly, FDA may not have investigated each violation at the time of publication.

Transition to New NRP Operating Structure

In the late 1990s, FSIS implemented the Hazard Analysis and Critical Control Point (HACCP) inspection system in all federally inspected plants. The HACCP regulation (9 CFR 417) requires FSIS-inspected slaughter and processing plants to identify all food safety hazards (including drug residues, chemical contaminants, pesticides) that are reasonably likely to occur before, during, and after entry of the food animal or product into the plant. The regulation also requires plants to identify preventive measures to control these hazards. FSIS takes regulatory action against plants that do not have an adequate chemical residue control program in place. Minimizing food safety hazards from farm to fork protects consumers from the public health risks associated with chemical contaminants in food.

In the past, the sampling program was designed to identify a select number of chemical hazards, primarily veterinary drugs and only a few pesticides and/or heavy metals to see if these chemicals were detected above established tolerances. For the past several years, FSIS sampled 230 or 300 animals for each chemical compound and animal production class pair. Production classes refer to specific animal slaughter classes and broadly include bovine, porcine, caprine, ovine, avian, equine, and other species. Applying these sampling rates ensures FSIS a 90% or 95% probability, respectively, of detecting chemical residue violations if the violation rate is equal to or greater than 1 % in the population being sampled.

With increasing public concern about the risks of chemical contaminants, there has been greater focus on strengthening the identification, ranking, and testing for chemical hazards in meat, poultry, and egg products in the U.S. The Calendar Year (CY) 2012 sampling plan for residues in FSIS-regulated products includes a shift towards a more public health-based sampling approach. This

approach includes broader screens for veterinary drugs and pesticides, more analyses for each sample, and the use of performance-based methods.

In August 2012, FSIS transitioned to the updated NRP sampling scheme for the remainder of the year, testing nine production classes for more than 100 chemical residues. The transition to using multi-residue analytical methods has eliminated pairing one compound class or individual compound with one production class and allowed FSIS to analyze more compounds per sample while collecting fewer samples. To implement this new approach, FSIS established three tiers of sampling for the NRP. The three-tiered system refers to scheduled sampling (Tier 1), targeted sampling at the production or compound class level (Tier 2), and targeted sampling at the herd/flock or compound class level (Tier 3).

Tier 1 includes the current scheduled sampling program. Collection of these data will serve as a baseline level for chemical residue exposure. While FSIS allocated a maximum of 300 samples per chemical compound class in the traditional program, the new structure allocates approximately 800 samples per chemical compound class for each of the production classes tested in Tier 1. By increasing the number of samples taken, FSIS increased the probability of finding a violation to 99% if the violation rate is equal to or greater than 1% in the population being sampled.

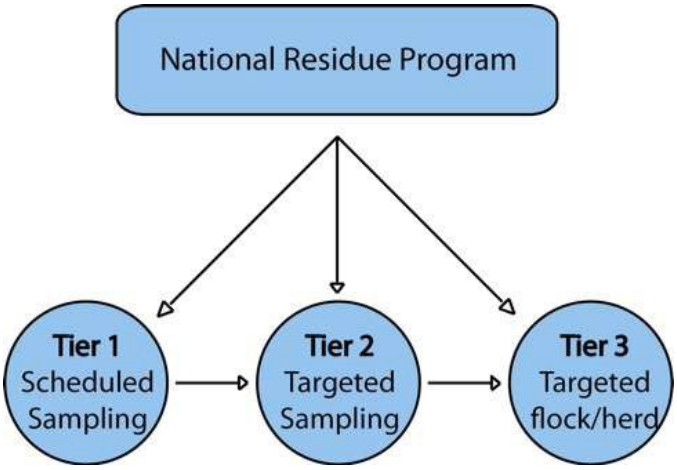
For Tier 1 within the 2012 domestic scheduled sampling program, FSIS ran thousands of analyses across the nine production classes (beef cows, bob veal, dairy cows, steers, heifers, market hogs, sows, young chickens, and young turkeys) representing 95% of domestic meat and poultry consumption. This change resulted in more analytical results for each production class.

Tier 2 includes the traditional inspector-generated sampling program at the plant level. When FSIS Inspection Program Personnel (IPP) detects evidence of disease or use of a drug, they hold and test samples from those carcasses because they might contain violative levels of chemical residues. In CY 2011, IPP completed more than 207,000 in-plant residue screens using the Kidney Inhibition Swab test (KIS™ Test) or the Fast Antimicrobial Screen Test (FAST). These screens resulted in approximately 5,000 positive samples submitted to the FSIS Midwestern Laboratory for confirmation, and 1,045 of these samples were confirmed to be violative. Starting in August 2012, FSIS began to test in-plant screen positives using a multi-residue screening method.

In addition, the new Tier 2 will includes directive-driven targeted testing at the production and compound class level as outlined in FSIS notices for sampling show animals, dairy cows, and bob veal calves. FSIS can adjust targeted sampling plans to respond to information about misuse of animal drugs and/or exposure to environmental chemicals gained from other agencies (such as FDA and EPA), as well as Tier 1 sampling data.

FSIS is further planning a Tier 3 level, which FSIS anticipates will be similar in structure to the exploratory assessment program in Tier 2, with the exception that Tier 3 will encompass targeted testing at a herd or flock level. A targeted testing program designed for livestock or flocks originating

from the same farm or region may be necessary on occasion to determine the level of exposure of a chemical or chemicals to which the livestock or flock may have been exposed. Tier 3 will provide a vehicle for developing information that will support possible future policy development within the NRP.



The import reinspection sampling program will be structured using the Tier 1 and 2 frameworks. In CY 2012, FSIS scheduled 1,300 import samples for collection. These import samples were comprised of 500 samples under the Tier 1 scheduled sampling and, based on interagency discussions, 800 samples under Tier 2. In addition, FSIS screened a subset of these samples for unknown compounds with the FSIS Food Emergency Response Network (FERN). FERN is a nation-wide integrated network of Federal, State, and local laboratories with the capability to detect and identify biological, chemical, and radiological agents in food. Note: FERN results are not reported in the Red Book.

New Methodologies

Based on interagency discussion and method improvements, FSIS began using a new screening method for antibiotics in the second half of 2012. The existing screening methodology for antibiotics was a 7-plate bioassay. The new multi-residue method (MRM) provides the following significant improvements: 1) it screens for a variety of analytes, not just antibiotics; 2) it has been validated at levels appropriate to tolerances; 3) it clearly distinguishes individual analytes, even if multiple drugs are present in the same sample, using mass spectrometry; 4) it mitigates unknown microbial inhibition responses; and 5) it reduces the time and personnel needed to obtain results.

The FSIS pesticide method has been in place since 2011. This method diversifies testing capability, improving on the previous pesticide method. Specifically, while the previous method could only test for halogenated compounds; the new screen tests 57 pesticides across multiple classes and includes additional compounds. ***See Appendix II for a list of current methods used by FSIS laboratories.***

Overview of the Sampling Plans

The NRP 2012 Residue Sampling Plans focuses on chemical residues in domestic meat, poultry, and egg products and addresses import reinspection of meat and poultry. The domestic sampling plan includes scheduled sampling and inspector-generated sampling. The import reinspection sampling plan encompasses normal sampling, increased sampling, and intensified sampling. FSIS Directive, 10,800.1, rev 1, *Procedures for Residue Sampling, Testing, and Other Responsibilities for the National Residue Program* provides further detail.

DOMESTIC SAMPLING PLAN

Scheduled Sampling

Scheduled sampling plans involve taking tissue samples from randomly selected food animals that have passed ante-mortem inspection. The development of scheduled sampling plans proceeded in the following manner for the first half of CY 20012:
1) determine which chemical compounds are of concern to food safety;
2) use algorithms to rank the selected chemical compounds;
3) pair these chemical compounds with appropriate food animals and egg products; and
4) establish the number of samples to be collected.

The Surveillance Advisory Team (SAT), an interagency committee comprising of representatives from FSIS, FDA, EPA, AMS, ARS, and CDC, determines the chemical compounds and production classes (e.g., young chickens, bob veal, steers, etc.) of public health concern. FSIS calculates the number of samples needed for the scheduled sampling. The laboratories test the samples for the presence of chemical residues and report any positive findings above established tolerance levels, or when there is no established tolerance. The resulting violation data are used to verify whether industry process controls and HACCP plans effectively control residues. FSIS, FDA, and EPA review and make final adjustments to the domestic scheduled sampling plan.

Inspector-Generated Sampling

Inspector-generated sampling is conducted by in-plant Public Health Veterinarians (PHVs) when they suspect that animals may have violative levels of chemical residues. Currently, inspector-generated sampling targets individual suspect animals and suspect populations of animals and animals condemned for specific pathologies. When an inspector-generated sample is collected and the carcass is not already condemned, only the carcass that is sampled is held. If the in-plant screen test result is negative, the carcass is released. If positive, the carcass is held pending the results of laboratory

testing. The PHV makes a final determination on the carcass based on the confirmed laboratory results.

Sampling for individual suspect animals

The in-plant inspector selects a carcass for sampling based on professional judgment and public health criteria outlined in FSIS Directive 10,800.1, rev 1 (i.e., animal with disease signs and symptoms, producer history, or results from random scheduled sampling). Some samples are screened in the plant by IPP and verified when necessary by a PHV. Other samples are sent directly to the laboratory for analysis. For example, if the IPP suspects the misuse of a veterinary drug in an animal, she/he can perform the relevant in- plant screening test. If the result of a screening test is positive, the carcass is held (if not already condemned for other pathology or conditions that would make it unfit for human consumption), and the liver, kidney, and muscle sample from the carcass is sent to an FSIS laboratory for confirmation.

Sampling for suspect animal populations

Sampling for suspect animal populations is directed by an FSIS regulation (e.g., 9 CFR 310.21), directive (e.g., FSIS Directive 10,220.3) or FSIS notice.

Actions taken on violations

A violation occurs when an FSIS laboratory confirms a residue that exceeds an established tolerance or action level, or has no tolerance. Once the laboratory analysis is complete, FSIS enters the residue violation into the FSIS Residue Violation Information System (RVIS), an FSIS/FDA interagency database. FDA has on-farm jurisdiction and evaluates the appropriate action to take on the violation. These actions range in severity, from providing education to taking legal action.

Every week, FSIS posts a Residue Repeat Violator List on its website. The list identifies producers with more than 1 violation on a rolling 12-month basis. In addition, the list provides helpful information to processors and producers who are working to avoid illegal levels of residues, serves as a deterrent for violators, and enables FSIS and FDA to make better use of resources. Because FSIS updates this list weekly, FDA may not have investigated each violation at the time of publication.

IMPORT REINSPECTION SAMPLING PLAN

Imported meat, poultry, and egg products are sampled through the port-of-entry Import Reinspection Sampling Plan, a chemical residue-monitoring program conducted to verify the equivalence of inspection systems in exporting countries. All imported products are subject to reinspection, and one or more types of inspection (TOI) are conducted on product before it enters the United States. Chemical residue sampling is included in the reinspection of imported products. The following are the three levels of chemical residue reinspection:

- Normal sampling: random sampling;
- Increased sampling: above-normal sampling resulting from an Agency management decision; and
- Intensified sampling: additional samples taken when a previous sample for a TOI failed to meet U.S. requirements.

For both normal and increased sampling, the lot is not required to be retained pending laboratory results; however, the importer may choose to retain the lot pending the laboratory results. The lot is subject to recall if it is not retained and is found to contain violative levels of residue. For intensified sampling, the lot must be retained pending laboratory results.

The data obtained from laboratory analyses are entered into the Public Health Information System (PHIS), an FSIS database designed to generate reinspection assignments, receive and store results, and compile histories for the performance of foreign plants certified by the inspection system in the exporting country.

Table 1. 2012 Estimated Slaughter Data by Production Class

Production Class	Number of Head Slaughtered[3]	Pounds per Animal (dressed weight)[4]	Total Pounds (dressed weight)	Percent Estimated Relative Production
Beef cows	3,351,200	608	2,037,529,600	1.842%
Bulls	563,950	877	494,584,150	0.447%
Dairy cows	3,116,251	608	1,894,680,608	1.713%
Heifers	9,265,452	792	7,338,237,984	6.636%
Steers	16,152,358	859	13,874,875,522	12.547%
Bob veal	368,697	75	27,652,275	0.025%
Formula-fed veal	321,767	245	78,832,915	0.071%
Non-formula-fed veal	10,602	350	3,710,700	0.003%
Heavy calves	31,384	400	12,553,600	0.011%
Subtotal, Cattle	**33,181,661**		**25,762,657,354**	**23.297%**
Market hogs	108,131,133	203	21,950,619,999	19.849%
Roaster pigs	797,220	70	55,805,400	0.050%
Boars/Stags	420,845	208	87,535,760	0.079%
Sows	3,034,518	306	928,562,508	0.840%
Subtotal, Swine	**112,383,716**		**23,022,523,667**	**20.819%**
Lambs	1,867,537	74	138,197,738	0.125%
Sheep	145,217	64	9,293,888	0.008%
Goats	557,793	50	27,889,650	0.025%
Subtotal, Ovine	**2,570,547**		**175,381,276**	**0.159%**
Bison	40,898	776	31,736,848	0.029%
Total, All Livestock	148,176,822		48,992,299,145	44.303%
Young chickens	8,502,858,100	Not Reported	48,462,298,303	43.823%
Mature chickens	145,908,292	Not Reported	829,201,396	0.750%
Young turkeys	253,906,092	Not Reported	7,459,786,971	6.746%
Mature turkeys	1,597,544	Not Reported	41,969,532	0.038%
Ducks	24,301,699	Not Reported	165,046,399	0.149%
Geese	192,114	Not Reported	2,295,201	0.002%
Other fowl (include ratites)	2,659,751	Not Reported	3,028,847	0.003%
Subtotal, Poultry	**8,931,423,592**		**56,963,626,649**	**51.511%**
Rabbits	640,673	Not Reported	1,830,105	0.002%
Egg products	Not Applicable	Not Applicable	4,627,887,131	4.185%
TOTAL, ALL PRODUCTION CLASSES			**110,585,643,030**	**100%**

This table aims to estimate, for each individual production class for which FSIS has regulatory responsibility, the amount of domestically-produced product relative to the total for all of these production classes. FSIS estimated this value by assuming that the relative amount of each production class consumed would be approximately proportional to the total poundage (based on dressed weight) of each production class presented for slaughter or processing in federally inspected plants. Dressed weight, which represents the weight of the carcass after the hide, hoof, hair, and viscera have been removed, was used instead of live weight, because the former was thought to be more closely representative of total pounds consumed. *Note: This table estimates the amount of domestically produced product that is consumed, regardless of who consumes it (i.e., no distinction is made between domestic products consumed domestically and products that are exported).*

[3] Number of heads is obtained from the Animal Disposition Reporting System (ADRS) and the Public Health Information System (PHIS).

[4] Average dressed weights are obtained from the publication "Livestock Slaughter 2012 Summary" – April 2013- and "Poultry Slaughter 2012 Summary" –Feb 2013- by National Agricultural Statistics Service (NASS). In the absence of average weight, an average weight based on the previous calendar year's data was used

Table 2. 2012 Summary of Import Volume by exported countries

Country	Net Weight Imported	Percent
Canada	1,372,905,219	43.73%
Australia	622,544,811	19.83%
New Zealand	408,276,453	13.00%
Mexico	246,212,900	7.84%
Uruguay	110,911,503	3.53%
Denmark	83,988,493	2.68%
Nicaragua	73,980,098	2.36%
Chile	48,069,350	1.53%
Brazil	40,427,361	1.29%
Israel	40,202,908	1.28%
Poland	20,969,454	0.67%
Costa Rica	14,352,991	0.46%
Honduras	14,262,673	0.45%
Italy	12,380,401	0.39%
Ireland	8,751,124	0.28%
Netherlands	7,949,793	0.25%
United Kingdom	3,286,147	0.10%
Northern Ireland	2,057,636	0.07%
Spain	1,957,556	0.06%
Germany	1,644,974	0.05%
Finland	1,630,075	0.05%
Argentina	1,216,973	0.04%
Hungary	483,245	0.02%
Iceland	447,701	0.01%
Croatia	327,873	0.01%
France	77,662	0.00%
Japan	61,007	0.00%
Sweden	45,666	0.00%
San Marino	3,716	0.00%
Total Presented:	**3,139,425,763**	**100.00%**

These data are for meat and poultry imports.
Egg product imports in 2012 = 13,118,996 pounds.
All egg product imports were from Canada.

Note: FSIS regulations for meat list England, Scotland, and Wales under one inspection system, while Northern Ireland is listed separately under another inspection system. Furthermore; FSIS poultry regulations list Great Britain only.

Definitions of FSIS Animal Production Classes

Bovine

- Beef cows are mature, female cattle bred for muscle development, ordinarily having given birth to one or more calves.
- Bulls are mature, uncastrated male cattle.
- Calves/veal: The agency is currently engaging in rulemaking to define "veal." For sampling purposes under the NRP, veal calves are defined as immature cattle (including dairy breeds) lacking a functional rumen and intended for meat production. They are recognized as a separate class from suckling calves because of their handling, housing, and proximity to slaughter.
- Dairy cows are mature, female cattle bred for milk production, ordinarily having given birth to one or more calves.
- Heifers are young, female cattle more than 1 year old that have not yet given birth to a calf.
- Steers are male cattle castrated before sexual maturity.

Porcine

- Boars are mature swine showing male sexual characteristics.
- Market hogs are swine, usually marketed near 6 months of age and 200 to 300 pounds live weight.
- Roaster pigs are animals of both sexes and any age that are marketed with the carcass unsplit and with the head on.
- Sows are mature, female swine, ordinarily having given birth to one or more litters.
- Stags are male swine castrated after they have reached sexual maturity.

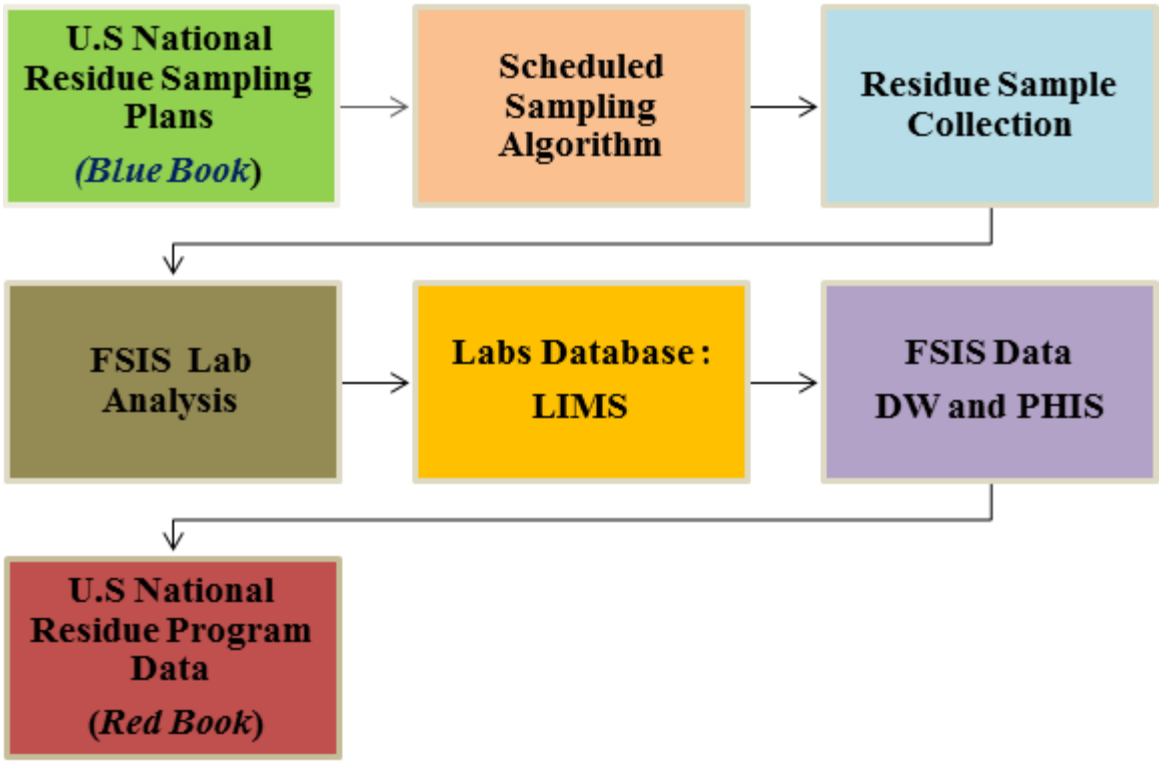
Poultry

- Ducks are birds of both sexes and any age.
- Egg products include yolks, whites, or whole eggs after breaking; eggs are processed as dried, frozen, or liquid.
- Geese are birds of both sexes and any age.
- Mature chickens are adult female birds, usually more than 10 months of age.
- Mature turkeys are birds of both sexes and usually more than 15 months of age.
- Young chickens include broilers/fryers birds of both sexes that are usually less than 10 weeks of age. Roasters are birds of both sexes, usually less than 12 weeks of age; capons are surgically castrated male birds usually less than 8 months of age.
- Young turkeys include fryer/roaster birds that are of both sexes and usually less than 12 weeks of age.
- Other poultry include ratites (e.g., ostriches, emus, and rheas), guineas, squabs (young, unfledged pigeons), adult pigeons, pheasants, grouse, partridge, quail, etc.

Other Livestock

- Goats are animals of both sexes and any age.
- Lambs are sheep younger than 14 months and having a break joint in at least one leg.
- Rabbits are any of several lagomorph mammals of both sexes and any age.

Figure 1. National Residue Program: Domestic Scheduled Samples Flow Chart



Note: The residue sample results with violation are also reported in the Residue Violation Information System (RVIS).

SUMMARY OF DOMESTIC DATA

Table 3. Number of samples tested, by production class
2012 Domestic Sampling Plan (Scheduled and Inspector-Generated)
Inspector-generated refers to KIS™ Test and FAST in-plant screening tests
(**not** including COLLGEN, SHOW, or STATE) project names

Production Class	Scheduled Samples Baseline Assessments Tier-1 US Fed Plants	Scheduled Samples Baseline Assessments Tier-1 US State Plants	Inspector-generated Samples, Suspect Animals FAST & KIS™
Beef Cows	712	40	19,417
Boars/Stags			154
Bob Veal	538	1	42,755
Bulls			2,331
Dairy Cows	721	20	99,385
Formula-Fed Veal			1,021
Goats			541
Heavy Calves			865
Heifers	395	25	3,717
Lambs			1,129
Market Hogs	682	64	18,074
Mature Sheep			473
Non-Formula-Fed Veal			1,786
Roaster Pigs			1,546
Sows	693	74*	10,089
Steers	370	29	11,371
Young Chickens	683	39	
Young Turkeys	719	33	
Total	**5,513**	**325**	**214,654****

Notes:

** Two violative sow samples were detected in US state plants.*

*** A total of additional 210 inspector-generated samples were collected and sent to FSIS labs for analysis. These samples are associated with project names: COLLGEN, SHOW, and STATE.*

Chemical Class Information Summary

Antibiotics

An antibiotic is a chemical substance that has the capability in dilute solutions to destroy or inhibit the growth of microorganisms. The widespread use of antibiotics over time has allowed microorganisms to adapt and develop resistance to these drugs.[7,8] Hence, inappropriate use and exposure to antibiotics can increase the risk of getting an infection that resists antibiotic treatment.[9] In addition, allergies to antibiotics have been reported in children and adults[10] and use of antibiotics in infants has been associated with childhood asthma.[11] FSIS tests different classes of antibiotics: aminoglycosides, *beta*-lactams, fluoroquinolones, macrolides, tetracyclines, and sulfonamides.[12]

FDA has assigned tolerances to many of the antibiotics tested within the NRP. These tolerance levels are provided in the Code of Federal Regulations, Chapter 21.

Arsenic[8]

In humans, the predominant dietary source of arsenic is seafood, followed by rice/rice cereal, mushrooms and poultry[13]. Ingestion of inorganic arsenic can cause gastrointestinal irritation and decreased red and white blood cell production, which can result in fatigue, abnormal heart rhythm, and nervous system effects (e.g., pins and needles). High oral doses can cause death. Evidence suggests that following long-term exposure, children show lower IQ scores. Inorganic arsenic is a known human carcinogen[1].

FDA tolerance levels for Arsenic are provided in the Code of Federal Regulations, Chapter 21.

Avermectins (Ivermectin and Doramectin) and Milbemycins (Moxidectin)

Avermectins (ivermectin and doramectin) and milbemycins (moxidectin) are macrocyclic lactones used in animal husbandry practices to prevent nematode and arthropod parasites. Ivermectin is an effective parasiticide. Doramectin is a potent endectocide that combines broad-spectrum activity with a prolonged duration of activity against the major internal and external parasites of cattle. Moxidectin is an antiparasitic drug that controls a range of internal and external parasites in

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[7] http://www.cdc.gov/drugresistance/about.html
[8] http://www.cdc.gov/drugresistance/pdf/public-health-action-plan-combat-antimicrobial-resistance.pdf
[9] http://www.cdc.gov/getsmart/antibiotic-use/know-and-do.html
[10] JM Langley and S Halperin (2002) *Can J Infect Dis*, **13(3)**:160-163 and http://www.allergy.org.au/health-professionals/hp-information/asthma-and-allergy/allergic-reactions-to-antibiotics
[11] Risnes *et al*. (2011) *Am J Epidemiol*, **173**:310–318
[12] http://www.fsis.usda.gov/Science/Chemistry_Lab_Guidebook/index.asp
[8] The method reduces organic arsenic to inorganic arsenic prior to quantification. The reported results include both original organic and inorganic arsenic species.
[13] http://www.atsdr.cdc.gov/ToxProfiles/tp2.pdf

sheep and cattle. Avermectins share their common antiparasitic activity via interaction at cell membrane receptors; mammals are less susceptible to the toxic effects because avermectins do not readily cross the blood-brain barrier. Nevertheless, adults and children are susceptible to effects on the nervous system. These effects include nausea and vomiting, dizziness, coma, and potentially death at high doses.[14]

FDA has assigned tolerances to many of the Avermectins across production classes. These tolerance levels are provided in the Code of Federal Regulations, Chapter 21.

beta-Agonists (Clenbuterol, Cimaterol, Ractopamine, Salbutamol, and Zilpaterol)

Beta-agonists are used for growth promotion in food animals, increasing lean muscle mass. Clenbuterol, a growth promotant, is not currently registered for use in livestock in the U.S. and is listed in AMDUCA as prohibited from extra-label use in animals intended for food. Ractopamine is used for increased rate of weight gain, improved feed efficiency, increased carcass leanness, and prevention and/or control of porcine proliferative enteropathies (ileitis). Zilpaterol is used for increased rate of weight gain, improved feed efficiency, and increased carcass leanness in cattle fed in confinement for slaughter during the last 20 to 40 days on feed. While the other *beta*-agonists are approved for use in the United States, cimaterol and salbutamol are not approved for use in food animals. In humans, clenbuterol and salbutamol are used as bronchodilators by asthma sufferers and as performance-enhancing drugs by athletes. Human side effects include increased heart rate and blood pressure, anxiety, palpitation and skeletal muscle tremors. The prolonged use of long-acting beta agonists can lead to the severe exacerbation of asthma symptoms[15]. All FDA-approved uses and tolerances for *beta*-Agonists are provided in the Code of Federal Regulations, Chapter 21.

Carbadox

Carbadox is a growth-promoting and antibacterial drug[16] approved to prevent or treat intestinal track inflammation (enteritis), as well as to improve feed efficiency and weight gain in swine. Carbadox and some of its metabolites (desoxycarbadox and hydrazine) are genotoxic and carcinogenic in rodents; however, the final metabolite, quinoxaline-2-carboxylic acid is not mutagenic or carcinogenic in animals. All FDA-approved uses and tolerances for Carbadox are provided in the Code of Federal Regulations, Chapter 21.

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[14] http://www.asiatox.org/6th%20APAMT%20pdf/Mectins%20posioning%20vs%20Avermectin%20poisoning.pdf

[15] http://www.fda.gov/Drugs/ResourcesForYou/HealthProfessionals/ucm219161.htm

[16] http://www.inchem.org/documents/jecfa/jecmono/v27je07.htm
and http://www.inchem.org/documents/jecfa/jecmono/v51je05.htm

Chloramphenicol

Chloramphenicol is a potent, broad-spectrum antibiotic with severe toxic effects in humans: bone marrow suppression or aplastic anemia in susceptible individuals. While microorganisms have developed resistance to the drug, it is still used selectively to treat bacterial infections. This drug is AMDUCA-prohibited for extra label use in animals intended for food. Chloramphenicol is not approved for use in food-producing animals.

Chlorinated Hydrocarbons and Chlorinated Organophosphates (Pesticides)

Chlorinated hydrocarbons, chlorinated organophosphates, organophosphates, and pyrethroids are effective insecticides[17]. Some of these compounds, such as DDT, are no longer marketed because of their extremely slow degradation in the environment (long half-life). Organophosphates and pyrethroids affect the nervous system, generally by disrupting the enzyme that regulates the neurotransmitter-acetylcholine. Typical symptoms of acute intoxication are headaches, dizziness, muscle twitching, weakness, tingling sensations, and nausea[18]. Children are at greater risk to some pesticides because their developing organs offer less protection than those of adults[19]. Chlorinated hydrocarbons, especially polychlorinated hydrocarbons (PCBs), can cause cancer.[20] Non-cancer effects in animals include effects on the immune system, the reproductive system, the nervous system, and the endocrine system.[4]

EPA has assigned tolerances to many of the pesticides tested within the NRP. These tolerance levels are provided in the Code of Federal Regulations, Chapter 40.

Florfenicol

Florfenicol is a broad-spectrum bacteriostatic antibiotic. It is typically used to treat cattle (bovine respiratory disease and foot rot)[21], although it has recently been approved for freshwater fish[22]. Horses and other equine animals may experience diarrhea. Toxicity studies in dogs, rats, and mice have associated the use of florfenicol with testicular degeneration and atrophy[23].

All FDA-approved uses and tolerances for Florfenicol are provided in the Code of Federal Regulations, Chapter 21.

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[17] http://www.epa.gov/pesticides/about/types.htm#chemical
[18] http://www.epa.gov/oppfead1/Publications/whatyouneed-hsstaff.pdf
[19] http://www.epa.gov/pesticides/food/pest.htm
[20] http://www.epa.gov/epawaste/hazard/tsd/pcbs/pubs/effects.htm

[21] http://www.nuflor.com/
[22] http://www.merck-animal-health-usa.com/products/130_163256/productdetails_130_163418.aspx
[23] http://intervetus.naccvp.com/?m=product_view&u=intervetus&p=intervetus&id=1047137

Flunixin

Flunixin is a non-steroidal anti-inflammatory drug (NSAID) with approved use in swine and cattle to alleviate inflammation and pain associated with musculoskeletal disorders. In general, NSAIDs in animals and humans can produce gastrointestinal (GI) side effects if the drug is taken at high doses over a prolonged period of time. GI ulceration is the most common side effect; however, kidney damage and bleeding problems can also occur[24].

All FDA-approved uses and tolerances for Flunixin are provided in the Code of Federal Regulations, Chapter 21.

Nitrofurans

Nitrofurans are synthetic chemotherapeutic agents with a broad antimicrobial spectrum[25]. Furaltadone is a synthetic nitrofuran antibiotic used to prevent intestinal infections and mastitis. It is not approved for use in food-producing animals. Furazolidone, which has wide-ranging applicability, is used to treat intestinal infections and is AMDUCA-prohibited for extra-label use. In small calves, overuse can lead to neurotoxicity (head tremors, ataxia, visual impairment, and convulsions). Nitrofurans are potentially carcinogenic and are not generally recognized as safe under any conditions of intended use that may reasonably be expected to result in their becoming a component of food[26].

Nitrofurans are not approved for use in food-producing animals.

Nitroimidazoles

Nitroimidazoles, such as dimetridazole and ipronidazole, are used to treat bacterial infections and parasites, but are AMDUCA-prohibited for extra-label use. For human health, the main targets for toxicity are the gastrointestinal tract and the nervous system[27]. Allergic reactions (skin rash, itching) may also occur[28].

Nitroimidazoles are not approved for use in food-producing animals.

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[24] http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/191606.htm&word=flunixin
[25] http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/191283.htm
[26] http://www.accessdata.fda.gov/cms_ia/importalert_33.html
[27] Roe FJC (1984) Safety of Nitroimidazoles; http://www.pnlee.co.uk/documents/FJCR_CV/ROE1984L.pdf and http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/191284.htm
[28] http://www.antibioticslist.com/nitroimidazoles.html

Sulfonamides

Sulfonamides are a group of drugs used to treat infections. Some of these drugs have bacteriostatic action. Oral exposure to sulfonamides can lead to hypersensitivity reactions (e.g. rashes and Stevens-Johnson Syndrome), effects on urine, effects on blood, photosensitivity and effects on the nervous system (e.g., insomnia and headaches). As with other antibiotics, microorganisms are developing resistance to this class of drugs.

All FDA-approved uses and tolerances for Sulfonamides are provided in the Code of Federal Regulations, Chapter 21.

2012 NRP Domestic Residue Scheduled Sampling

The U.S. National Residue Program (U.S. NRP) samples on a calendar-year basis for meat, poultry and processed egg products, and constitutes a risk-based, FSIS headquarters-driven testing program.

The NRP Residue sampling plans focus on chemical residues in domestic meat and poultry products. The domestic sampling plan includes scheduled sampling plans involve random tissue sampling from food animals that have passed ante-mortem inspection.

Under the scheduled sampling program in calendar year (CY) 2012, FSIS tested nine Slaughter Classes (beef cows, bob veal, dairy cows, heifers , steers, , market hogs, sows, young chickens, and young turkeys) representing 95% of domestic meat and poultry slaughter production.

In July 2012, FSIS announced in a Federal Register Notice (FRN) that the Agency was restructuring the U.S. NRP with respect to how sampling of chemical compounds and animal production and egg product classes is scheduled. Concurrently, FSIS implemented several multi-residue methods for analyzing samples of meat, poultry, and processed egg products for animal drug residues, pesticides, and environmental contaminants in its inspector-generated testing program.

These modern, high-efficiency methods will conserve Agency resources and provide useful and reliable results while enabling FSIS to analyze each sample for more compounds.

In August 2012, FSIS implemented a new sampling program using two new multi-residue chemical methods for the scheduled program. Because the screens are capable of evaluating multiple classes of veterinary drugs in each sample. FSIS discontinued the practice of testing slaughter classes for a single compound or chemical classes “paired sampling,” i.e. testing one sample for a single chemical or chemical compound class.

DOMESTIC RESIDUE SCHEDULED SAMPLING RESULTS

Pre-August

This section reports the summary results from the FSIS Domestic Scheduled Sampling Plan. The preliminary summary results are presented by compound class and slaughter class. Data Source: FSIS PHIS database.

Table 4 contains the summary of domestic scheduled sampling results and provides the number of samples analyzed by compound class. column 1: lists the compound class, column 2: the number of samples, column 3: the number of non-violative positives (e.g., compounds detected at a level equal to or below the established tolerance), and column 4: the number of violations.

Tables 5-14 contain the summary of domestic scheduled sampling results, and provide the number of samples analyzed by slaughter class. column 1: lists the compound class, column 2: the number of samples, column 3: the number of non-violative positives (e.g., compounds detected at a level equal to or below the established tolerance), and column 4: the number of violations.

Table 15 summarizes violation results by Slaughter Class. These include chemical compound class (column 2), chemical residue (column 3), tissue type (column 4), and residue detected results in ppb or ppm (column 5). Note: Residue detected results with "**8888**" indicate instances when residues were detected, but were not quantitated.

Post-August

Table 15 lists the chemical classes – including the new methods- associated with slaughter classes.

Tables 16 contain the summary of domestic scheduled sampling number of samples (animal) analyzed, and analyses done by slaughter class: column 2: number of non-detected samples, column 3: number of non-violative positive samples, column 4: number of confirmed violative samples, column5: number of detected (non-regulated) samples, column 6: number of non-detected (non-regulated) samples, and column 7: total number of samples.

Tables 17 contain the summary of domestic scheduled sampling number of analyses done by slaughter class: column 2: number of non-detected analyses, column 3: number of non-violative positive analyses, column 4: number of confirmed violative analyses, colum5: number of detected (non-regulated) analyses, column 6: number of non-detected (non-regulated) analyses, and column 7: total number of analyses done.

Table 18 summarizes violation results by slaughter Class. These include chemical compound class (column 2), chemical residue (column 3), tissue type (column 4), and residue detected results in ppb or ppm (columns 5). Note: Residue detected results with "**8888**" indicate instances when residues were detected, but were not quantitated.

Slaughter Class Pre-August Results

Table 4: Total Number of Samples by Slaughter Class
2012 Domestic Scheduled Sampling Plan (Pre-August)

Slaughter Class	Number of Non-Detect Samples	Number of Non-violative Positives	Number of Non-Regulatory Samples *	Number of Lab-Confirmed Violative Samples	Total Samples
Beef Cows	423	2	0	0	425
Bob Veal	307	1	0	6	314
Dairy Cows	429	3	0	0	432
Heifers	234	2	0	0	236
Steers	215	2	0	0	217
Market Hogs*	336	1	70	0	407
Sows	413	1	0	0	414
Young Chickens	405	0	0	0	405
Young Turkeys	432	0	0	0	432
TOTAL	**3,194**	**12**	**70**	**6**	**3,282**

Note: *(Exploratory assessment) sample for Lead and Cadmium

Table 5. Beef Cows Summary (Pre-August)
2012 Domestic Scheduled Sampling Plan

Compound Class	Number of Non-Detect Samples	Number of Non-violative Positives	Number of Lab-Confirmed Violative Samples	Total Samples
Avermectins	132	2	0	134
Antibiotics-Flunixin-Sulfonamides	291	0	0	291
TOTAL	**423**	**2**	**0**	**425**

Table 6. Bob Veal Summary (Pre-August)
2012 Domestic Scheduled Sampling Plan

Compound Class	Number of Non-Detect Samples	Number of Non-violative Positives	Number of Lab-Confirmed Violative Samples	Total Samples
Antibiotics-Flunixin-Sulfonamides	307	1	6	314
TOTAL	**307**	**1**	**6**	**314**

Table 7. Dairy Cows Summary (Pre-August)
2012 Domestic Scheduled Sampling Plan

Compound Class	Number of Non-Detect Samples	Number of Non-violative Positives	Number of Lab-Confirmed Violative Samples	Total Samples
Antibiotics-Flunixin-Sulfonamides	187	1	0	188
Avermectins	89	2	0	91
Pesticides/Herbicides	77	0	0	77
Furazolidone-Furaltodone	76	0	0	76
TOTAL	**429**	**3**	**0**	**432**

Table 8. Heifers Summary (Pre-August)
2012 Domestic Scheduled Sampling Plan

Compound Class	Number of Non-Detect Samples	Number of Non-violative Positives	Number of Lab-Confirmed Violative Samples	Total Samples
Antibiotics-Sulfonamides	120	0	0	120
beta-Agonists	114	2	0	116
TOTAL	**234**	**2**	**0**	**236**

Table 9. Steers Summary (Pre-August)
2012 Domestic Scheduled Sampling Plan

Compound Class	Number of Non-Detect Samples	Number of Non-violative Positives	Number of Lab-Confirmed Violative Samples	Total Samples
Antibiotics-Sulfonamides	33	0	0	33
Avermectins	49	0	0	49
Florfenicol	47	0	0	47
Pesticides/Herbicides & beta Agonists	86	2	0	88
TOTAL	**215**	**2**	**0**	**217**

Table 10. Market Hogs Summary (Pre-August)
2012 Domestic Scheduled Sampling Plan

Compound Class	Number of Non-Detect Samples	Number of Non-violative Positives	Number of Non-Regulatory Samples *	Number of Lab-Confirmed Violative Samples	Total Samples
Arsenic	67	0	0	0	67
Antibiotics-Sulfonamides	66	0	0	0	66
beta Agonists & Carbadox	136	1	0	0	137
Lead and Cadmium *	0	0	70	0	70
Furazolidone & Furaltodone	67	0	0	0	67
TOTAL	**336**	**1**	**70**	**0**	**407**

Note: *(Exploratory assessment) sample for Lead and Cadmium

Table 11. Sows Summary (Pre-August)

Compound Class	Number of Non-Detect Samples	Number of Non-violative Positives	Number of Lab-Confirmed Violative Samples	Total Samples
Antibiotics-Sulfonamides	236	1	0	237
Pesticides/Herbicides	177	0	0	177
TOTAL	**413**	**1**	**0**	**414**

2012 Domestic Scheduled Sampling Plan
Table 12. Young Chicken Summary (Pre-August)
2012 Domestic Scheduled Sampling Plan

Compound Class	Number of Non-Detect Samples	Number of Non-violative Positives	Number of Lab-Confirmed Violative Samples	Total Samples
Chloramphenicol & Arsenic	133	0	0	133
Antibiotics-Sulfonamides	138	0	0	138
Pesticides/Herbicides	134	0	0	134
TOTAL	**405**	**0**	**0**	**405**

Table 13. Young Turkeys Summary (Pre-August)
2012 Domestic Scheduled Sampling Plan

Compound Class	Number of Non-Detect Samples	Number of Non-violative Positives	Number of Lab-Confirmed Violative Samples	Total Samples
Antibiotics-Sulfonamides	143	0	0	143
Chloramphenicol & Arsenic	288	0	0	289
TOTAL	**432**	**0**	**0**	**432**

Table 14. Violations Report (Pre-August) 2012 Domestic Scheduled Sampling Plan

Slaughter Class	Compound Class	Residue	Tissue	Result (ppm)
Bob Veal	Antibiotics	Dihydrostreptomycin	Kidney	4.37
Bob Veal	Antibiotics	Neomycin	Kidney	8.14
Bob Veal	Antibiotics	Penicillin	Kidney	0.23
	Antibiotics	Gentamycin Sulfate		8888*
Bob Veal	Antibiotics	Dihydrostreptomycin	Kidney	4.11
Bob Veal	Antibiotics	Tilmicosin	Liver	3.78
Bob Veal	Antibiotics	Neomycin	Kidney	7.21

Post –August Results

Beginning August 2012, FSIS implemented a new sampling program using new multi-residue chemical methods for the scheduled program. Because the screens are capable of evaluating multiple classes of veterinary drugs, each individual sample was tested for hundreds of chemical

Table 15. List of chemical class –including the new methods, associated with slaughter classes (Post-August 2012)

Slaughter Class by Compound Class *CY 2012*: Aug-Dec									
Methods/Classes (# of Chemical Residues)	**Beef Cows**	**Bob veal**	**Dairy cows**	**Heifers**	**Steers**	**Market hogs**	**Sows**	**Young chickens**	**Young turkeys**
Multi-class (52)	√	√	√	√	√	√	√		
Aminoglycoside (9)	√	√	√	√	√	√	√	√	√
Pesticides (56)	√	√	√	√	√	√	√	√	√
Metals (7)	√	√	√	√	√	√	√	√	√
***beta*-agonists (5)**	√	√	√	√	√				
Avermectins (3)	√	√	√	√	√	√	√		
Carbadox						√			
Nitrofurans (2)			√			√	√		
Arsenic	√	√	√	√	√	√	√	√	√

Table 16. Total Number of Samples by Slaughter Class
2012 Domestic Scheduled Sampling Plan (Post-August)

Slaughter Class	Number of Non-Detect Samples	Number of Non-violative Positives	Number of Lab-Confirmed Violative Samples	Number of Non-Detect Non-Regulated Samples	Total Samples
Beef Cows	287	0	0	0	287
Bob Veal	218	3	3	0	224
Dairy Cows	285	4	0	0	289
Heifers	157	2	0	0	159
Steers	150	2	1	0	153
Market Hogs	271	2	2	0	275
Sows	278	1	0	0	279
Young Chickens	278	0	0	0	278
Young Turkeys	287	0	0	0	287
TOTAL	**2,211**	**14**	**6**	**0**	**2,231**

Table 17: 2012 Domestic Scheduled Sampling Plan (Post-August)

Number of analyses per production class.
Note: *There were many analyses performed on each sample.*

Slaughter Class	Number of Non-Detect Analyses	Number of Non-violative Positives Analyses	Number of Lab-Confirmed Violative Analyses	Number of Detect (Non Regulated Analyses)	Number of Non-Detect (Non Regulated Analyses)	Total Number of Analyses Performed
Beef Cows	25,878	0	0	5	298	26,181
Bob Veal	19,707	3	6	2	332	20,050
Dairy Cows	24,905	4	0	1	343	25,253
Heifers	13,571	2	0	20	210	13,803
Steers	13,197	3	1	14	221	13,436
Market Hogs	24,423	2	3	5	305	24,738
Sows	24,281	1	0	4	364	24,650
Young Chickens	7,482	0	0	2	2947	7,781
Young Turkeys	7,045	0	0	3	345	7,393
TOTAL	**160,489**	**15**	**10**	**56**	**2,715**	**163,285**

Table18. Violations Report (Post-August)
2012 Domestic Scheduled Sampling Plan

Slaughter Class	Compound Class	Residue	Tissue	Result (ppm)
Bob Veal	Sulfonamides	Sulfamethazine	Muscle	14.21
			Liver	13.73
Bob Veal	Sulfonamides	Sulfadimethoxine	Muscle	1.60
			Liver	0.93
Bob Veal	Sulfonamides	Sulfamethazine	Liver	110.81
			Muscle	100.79
Steer	Sulfonamides	Sulfamethazine	Liver	0.30
Market hogs	Antibiotics	Lincomycin	Kidney	8888*
Market hogs	Sulfonamides	Sulfamethazine	Liver	0.482
			Muscle	0.12

2012 Domestic Residue Scheduled Sampling -Targeted Assessments

Environmental Contaminants (Cadmium and Lead)

In 2012, FSIS conducted a survey of the prevalence of cadmium and lead in nine animal classes, collecting 558 samples (in parenthesis), which yielded 1,197 analysis results from muscle and kidney tissues. Muscle and kidney samples with cadmium levels below the Minimum Level of Applicability[9] (i.e., 10 ppb for cadmium and 25 ppb for lead) are labeled as non-detect (ND) in Tables 19 and 20. Table 19 presents the number of positives and ND analyses by metal and tissue analyzed.

Table 19. Number of Positive and Non-detect samples analyses tested for Cadmium and Lead, 2012 Targeted Assessments Results

Animal Class / (Number of Samples)			Number of Analyses		
			Non Detect	Positive[10]	Total
Animal	**Compound**	**Tissue**			
Beef Cow **(54)**	Cadmium	Muscle	54	0	54
	Lead	Muscle	53	**1**	54
Bob Veal **(57)**	Cadmium	Muscle	57	0	57
	Lead	Muscle	57	0	57
Dairy Cow **(62)**	Cadmium	Muscle	62	0	62
	Lead	Muscle	62	0	62
Heifer **(40)**	Cadmium	Muscle	40	0	40
	Lead	Muscle	40	0	40
Market Hogs **(130)**	Cadmium	Kidney	0	**70**	70
		Muscle	130	0	130
	Lead	Kidney	49	**4**	53
		Muscle	88	0	88

[9] Minimum Level of Applicability: The minimum level at which a method has been validated.
[10] Positive samples have detectable Minimum levels above 10 ppb for cadmium and 25 ppb for lead.

***Continued*: Table 19. Number of Positive and Non-detect samples analyses tested for Cadmium and Lead, 2012 Targeted Assessments Results**

Animal Class / (Number of Samples)			Number of Analyses		
Animal	**Compound**	**Tissue**	**Non Detect**	**Positive[10]**	**Total**
Sow **(64)**	Cadmium	Muscle	64	0	64
	Lead	Muscle	63	**1**	64
Steer **(40)**	Cadmium	Muscle	40	0	40
	Lead	Muscle	40	0	40
Young Chicken **(52)**	Cadmium	Muscle	52	0	52
	Lead	Muscle	52	0	52
Young Turkey **(59)**	Cadmium	Muscle	59	0	59
	Lead	Muscle	59	0	59
TOTAL (558)			**1,121**	**76**	**1,197**

[10] Positive samples have detectable levels above 10 ppb for cadmium and 25 ppb for lead.

.

Table 20. Cadmium and Lead Levels in Kidneys and Muscles, by Animal Class, 2012 Targeted Assessments Results

Animal Class	Metal	Tissue	Number of Positive Analyses	Range (ppb)	Median Levels (ppb)	Mean Levels (ppb)	Standard Deviation	95th percentile
Beef Cows	Lead	Muscle	1	33.94	33.94	N/A	N/A	N/A
Market Hogs	Cadmium	Kidney	70	20.74- 424.74	99.81	137.90	94.79	368.60
Market Hogs	Lead	Kidney	4	32.85- 102.20	66.24	66.87	28.38	102.20
Sows	Lead	Muscle	1	30.48- 30.48	N/A	N/A	N/A	N/A

All values presented in the table are applicable to positive analyses only.

2012 Domestic Residue Scheduled Sampling: Inspector-Generated Sampling

Public Health Veterinarian (PHVs), and Consumer Safety Inspectors (CSIs) under the guidance of a PHV, conduct inspector-generated sampling when an animal is suspected to have undergone drug treatment and possibly contains violative levels of chemical residues. Sample screening utilizes the FAST or the KIS™ Test. If FAST supplies or KIS™ Test kits are not available, the PHV submits the sample to the FSIS laboratory for testing. FSIS has been incorporating the KIS™ Test in all slaughter plants since August 2011, and FSIS intends to phase in the KIS™ Test as the only in-plant screening test for the Agency in CY2012.

Table 21 summarizes the total number of in-plant screen tests using the FAST or the KIS™ Test. This includes the number of in-plants screens tests with negative results, and the number of positive in-plant screens tests that were sent to FSIS labs for confirmation.

Table 22 summarizes the total number of samples analyzed and the number of animals with violations for each production class. Column 1 lists the production classes and columns 2-6 show the number of samples and violations for COLLGEN, FAST, KIS, SHOW and STATE projects respectively.

Tables 23 identifies the results for specific compounds that were detected (violative) within the production class across inspector-generated projects names (i.e., COLLGEN, FAST, KIS™, etc.) respectively. Column 1 lists the production class and the remaining columns list the specific project names.

Tables 24-25 identifies the results for specific chemical compounds that were detected (violative) within several inspector generated project names, and within production class across inspector-generated program respectively.

Similarly, the inspector-generated sampling results for non-violative positive residue samples are detailed in Tables 26-28. Table 26 identifies the results for specific compounds that were detected (non-violative) within the production class across inspector-generated projects names (i.e. COLLGEN, FAST, KIS™, etc.) respectively. Column 1 lists the production class and the remaining columns list the specific project names.

Tables 27-28 identifies the results for specific chemical compounds that were detected (non-violative) within several inspector-generated projects, within production class across inspector-generated program respectively.

1. Samples Screened In-plant and Confirmed in an FSIS Laboratory

Fast Antimicrobial Screen Test (FAST)

FSIS IPP used FAST kits to screen 14,655 samples for antibiotic and sulfonamide residues. In-plant positive samples were sent to the labs to repeat the FAST. These FAST-positive samples were also analyzed for flunixin, a non-steroidal, anti-inflammatory compound. FSIS laboratories confirmed 41 violations in 29 animals. The most violative residue was Penicillin (26); also detected were Flunixin (5), and Sulfamethazine (4).

Kidney Inhibition Swab (KIS™) Test

FSIS IPP used KIS™ Test kits to screen 199,999 samples for antibiotic and sulfonamide residues. In-plant positive samples were sent to the labs to repeat the KIS™ Test. These KIS™-positive samples were analyzed for flunixin, a non-steroidal, anti-inflammatory compound. FSIS laboratories confirmed 1,125 violations in 900 animals. The three most violative chemicals residue results were: Penicillin (244), Neomycin (209), and Desfuroylceftiofur Cystine Disulfide (DCA) (172).

2. Samples Confirmed in an FSIS Laboratory

Collector-Generated (COLLGEN)

FSIS IPP analyzed samples collected from 79 animals for antibiotic and sulfonamide residues. FSIS laboratories confirmed 2 violations: Oxytetracycline, and Penicillin, in beef cow and market swine, respectively.

Show Animals (SHOW)

Analyses were conducted for antibiotic and sulfonamide residue in 85 animals, including 4 heifers, 8 lambs, 62 market hogs, and 20 steers. One violation, Sulfamethazine in a market hog, was detected.

State or Government Agency Testing (STATE)

Analyses were conducted for antibiotic and sulfonamide residue in 46 animals. Twelve violatives residue results were in five animals (market swine, heifer, and steer) were found. The violative residues were: Sulfamethazine (8), Penicillin (3), and Zeranol (1).

Table 21: Summary Results, 2012 Inspector-Generated Sampling (by Test Type)
Number of In-plant screens tests performed at Plants/Plants

Production Class	FAST			KIS™			TOTAL		
	Number of In-plant (screened) Negative Samples	• Number of In-plant (screened) Positive Samples	Total FAST In-plant (screened) Samples	Number of In-plant (screened) Negative Samples	* Number of In-plant (screened) Positive Samples	Total KIS™ In-plant (screened) Samples	Number of In-plant (screened) Negative Samples	Number of In-plant (screened) Positive Samples	Total In-plant (screened) Samples
Beef Cows	4	**1**	5	18,868	**554**	19,412	18,872	**545**	19,417
Boars/Stags	37	**-**	37	114	**3**	117	151	**3**	154
Bob Veal	10	**-**	10	41,943	**802**	42,745	41,953	**802**	42,755
Bulls	7	**-**	7	2,245	**79**	2,324	2,252	**79**	2,331
Dairy Cows	13	**2**	15	96,555	**2,815**	99,370	96,568	**2817**	99,385
Formula-Fed Veal	-	-	-	989	**32**	1,021	989	**32**	1,021
Goats	309	**2**	311	227	**3**	230	536	**5**	541
Heavy Calves	29	**8**	37	768	**60**	828	797	**68**	865
Heifers	14	**0**	14	3,586	**117**	3,703	3,600	**117**	3,717
Lambs	662	**5**	667	460	**2**	462	1122	**7**	1,129
Market Hogs	7,251	**86**	7337	10,663	**74**	10,737	17,914	**160**	18,074
Mature Sheep	304	**3**	307	166	**-**	166	470	**3**	473
Non-Formula-Fed Veal	2	**-**	2	1,677	**107**	1,784	1,679	**107**	1,786
Roaster Pigs	808	**34**	842	700	**4**	704	1,508	**38**	1,546
Sows	4,974	**80**	5054	4,926	**109**	5,035	9,900	**189**	10,089
Steers	10	**-**	10	11,145	**216**	11,361	11,155	**216**	11,371
Total	**14,434**	**221**	**14,655**	**195,032**	**4,967**	**199,999**	**209,466**	**5,188**	**214,654**

***** Samples that are FAST and/or KIS™ Test positive in the plant are further analyzed for flunixin and phenylbutazone in the laboratory

Table 22: 2012 Inspector-Generated Sampling Results: Summary of Violative Residue Animals by Project Name

Production Class	COLLGEN		FAST		KIS ™		SHOW		STATE	
	Number of Samples	**Number of Animals With Confirmed Lab Violations**	* Number of In-plant (screened) Positive Samples	Number of Animals With Confirmed Lab Violations	* Number of In-plant (screened) Positive Samples	**Number of Animals With Confirmed lab Violations**	Number of Samples	**Number of Animals With Confirmed Lab Violations**	Number of Samples	**Number of Animals With Confirmed Lab Violations**
Beef Cows	3	**1**	1	-	554	**63**	1	-	3	-
Boars/Stags	-	-	-	-	3	-	-	-		-
Bob Veal	8	-	-	-	802	**283**	-	-		-
Bulls	1	-	-	-	79	**8**	-	-	1	-
Dairy Cows	22	-	2	1	2,815	**419**	-	-	5	-
Formula-Fed Veal	-	-	-	-	32	**1**	-	-		-
Goats	2	-	2	-	3	-	3	-	2	-
Heavy Calves	-	-	8	4	60	**5**	-	-	2	-
Heifers	2	-	-	-	117	**16**	2	-	3	**1**
Lambs	1	-	5	2	2	-	7	-	1	-
Market Hogs	12	**1**	86	4	74	**6**	51	**1**	11	**6**
Mature Sheep	-	-	3	-	-	-	2	-		-
Non-Formula-Fed Veal	1	-	-	-	107	**23**	-	-		-
Roaster Pigs	1	-	34	-	4	-	-	-	2	-
Sows	2	-	80	17	109	**45**	-	-	-	-
Steers	18	-	-	-	216	**31**	19	-	8	**1**
Other**	6	-	-	-	-		-	-	8	**1**
Total	79	**2**	221	**28**	4,967	**900**	85	**1**	46	**8**

* Cattle samples that are FAST and/or KIS™ Test positive in the plant are further analyzed for flunixin in the laboratory

** Other represents samples submitted without identification of production class.

Table 23: 2012 Inspector-Generated Sampling Results: Distribution of Violative Residues by Production Class and Project Name
Note: Multiple violative residue results may be associated a single sample (animal)

Production Class	Project Name					
	FAST	**KIS™ Test**	**COLLGEN**	**SHOW**	**STATE**	**Total**
Beef Cows	--	81	1	--	--	**82**
Bob Veal	--	371	--	--	--	**371**
Bulls	--	13	--	--	--	**13**
Dairy Cows	2	501	--	--	--	**503**
Formula-Fed Veal	--	1	--	--	--	**1**
Heavy Calves	8	6	--	--	--	**14**
Heifers	--	20	--	--	1	**21**
Lamb	3		--	--	--	**3**
Market Swine	4	11	1	2	10	**28**
Non-Formula-Fed Veal	--	27	--		--	**27**
Sows	24	54	--	--	--	**78**
Steers	--	40	--	--	1	**41**
TOTAL	**41**	**1,125**	**2**	**2**	**12**	**1,182**

Table 24: 2012 Inspector-Generated Sampling Results: Distribution of Violative Residue by Chemical Residue and Project Name

Note: Multiple violative residue results may be associated with a single sample (animal)

Chemical Residue	Project Name					Total
	FAST	KIS ™ Test	COLLGEN	SHOW	STATE	
Amikacin	--	1	--	--	--	**1**
Ampicillin	--	15	--	--	--	**15**
Cefazolin	--	1	--	--	--	**1**
Ciprofloxacin	--	4	--	--	--	**4**
Desethylene Ciprofloxacin	--	1	--	--	--	**1**
Desfuroylceftiofur Cystine Disulfide	1	172	--	--	--	**173**
Dexamethasone	--	2	--	--	--	**2**
Dihydrostreptomycin	--	15	--	--	--	**15**
Enrofloxacin	--	2	--	--	--	**2**
Florfenicol	--	17	--	--	--	**17**
Flunixin	5	96	--	--	--	**101**
Gamithromycin	--	3	--	--	--	**3**
Gentamycin Sulfate	--	40	--	--	--	**40**
Lincomycin	--	1	--	--	--	**1**
Naficillin	1	--	--	--	--	**1**

Continued: **Table 24. 2012 Inspector-Generated Sampling Results: Distribution of Violative Residue by Chemical Residue and Project Name**
Note: Multiple violative residue results may be associated with a single sample (animal)

Chemical Residue	Project Name					Total
	FAST	KIS ™ Test	COLLGEN	SHOW	STATE	
Neomycin	--	209	--	--	--	209
Oxytetracycline	2	33	1	--	--	36
Penicillin	26	244	1	--	3	274
Sulfadiazine	--	1	--	--	--	1
Sulfadimethoxine	2	86	--	--	--	88
Sulfadoxine	--	2	--	--	--	2
Sulfaethoxypyridazine	--	2	--	--	--	2
Sulfamethazine	4	82	--	2	8	96
Sulfamethoxazole	--	41	--	--	--	41
Tetracycline	--	5	--	--	--	5
Tilmicosin	--	46	--	--	--	46
Tulathromycin	--	3	--	--	--	3
Tylosin	--	1	--	--	--	1
Zearalanol	--	--			1	1
Total	**41**	**1,125**	**2**	**2**	**12**	**1,182**

Table 25: 2012 Inspector-Generated Sampling Results: Distribution of Residue Violations, By Chemical Residue, and Animal Class (Includes FAST and KIS™ Tests)
Note: Multiple violative residue results may be associated with a single sample (animal)

Chemical Residue	Beef Cows	Bob Veal	Bulls	Dairy Cow	Formula-fed Veal	Heavy Calf	Heifer	Lamb	Market Swine	Non Formula - Fed Veal	Sows	Steers	Total
Amikacin	--	--	--	1	--	--	--	--	--	--	--	--	**1**
Ampicillin	--	1	--	13	1	--	--	--	--	--	--	--	**15**
Cefazolin	--		--	1	--	--	--	--	--	--	--	--	**1**
Ciprofloxacin	--	2	--	--	--	--	1	--	1	--	--	--	**4**
Desethylene Ciprofloxacin	--	1	--	--	--	--	--	--	--	--	--	--	**1**
Desfuroylceftiofur Cystine Disulfide	4	26	--	130	--	1	4	--	--	--	1	7	**173**
Dexamethasone	--	2	--	--	--	--	--	--	--	--	--	--	**2**
Dihydrostreptomycin	--	5	--	10	--	--	--	--	--	--	--	--	**10**
Enrofloxacin	--	2	--	--	--	--	--	--	--	--	--	--	**2**
Florfenicol	9	1	2		--	--	1	--	--	--	--	4	**17**
Flunixin	11	19	--	59	--	8	1	--	--	--	--	3	**101**
Gamithromycin	--	3	--	--	--	--	--	--	--	--	--	--	**3**
Gentamycin Sulfate	2	5	1	19	--	--	2	--	--	3	--	8	**40**
Lincomycin	--	--	--	--	--	--	--	--	1	--	--	--	**1**
Naficillin	--	--	--	--	--	--	--	--	--	--	1	--	**1**

C*ontinued:* Table 25. 2012 Inspector-Generated Sampling Results: Distribution of Residue Violations, By Chemical Residue, and Animal Class (Includes FAST and KIS™ Tests)
Note: Multiple violative residue results may be associated a single sample (animal)

Chemical Residue	Beef Cows	Bob Veal	Bulls	Dairy Cow	Formula-fed Veal	Heavy Calf	Heifer	Lamb	Market Swine	Non Formula -Fed Veal	Sows	Steers	Total
Neomycin	--	188	--	6	--	--	1	--	--	14	--	--	**209**
Oxytetracycline	12	12	4	5	--	--	1	2	--	--	--	--	**36**
Penicillin	21	13	2	147	--	1	4	--	5	--	75	6	**274**
Sulfadiazine	--	1	--	--	--	--	--	--	--	--	--	--	**1**
Sulfadimethoxine	--	15	--	62	--	1	1	1	--	4		4	**88**
Sulfadoxine	--	--	--	1	--	--	--	--	--	--	1	--	**2**
Sulfaethoxypyridazine	--	2	--	--	--	--	--	--	--	--	--	--	**2**
Sulfamethazine	10	19	3	33	--	3	4	--	20	1	--	3	**96**
Sulfamethoxazole	--	41	--	--	--	--	--	--	--	--	--	--	**41**
Tetracycline	--	2	--	3	--	--	--	--	--	--	--	--	**5**
Tilmicosin	13	9	1	13	--	--	1	--	--	3	--	6	**46**
Tulathromycin	--	1	--	--	--	--	--	--	--	2	--	--	**3**
Tylosin	--	1	--	--	--	--	--	--	--	--	--	--	**1**
Zearalanol	--	--	--	--	--	--	--	--	1	--	--	--	**1**
Total	**82**	**371**	**13**	**503**	**1**	**14**	**21**	**3**	**28**	**27**	**78**	**41**	**1,182**

Table 26: 2012 Inspector-Generated Sampling Results:
Distribution of Positive Non-Violative Residues by Production Class and Project Name
Note: Multiple Positive non-violative residue results may be associated with a single sample (animal)

Production Class	Project Name					Total
	FAST	KIS™ Test	COLLGEN	SHOW	STATE	
Beef Cows	--	137	--	--	--	**137**
Bob Veal	--	366	1	--	--	**367**
Bulls	--	22	--	--	--	**22**
Dairy Cows	--	587	--	--	--	**587**
Formula-Fed Veal	--	8	--	--	--	**8**
Goats	--	1	1	--	1	**3**
Heavy Calves	7	15	--	--	1	**23**
Heifers	--	--	--	--	--	**34**
Lamb	4	--	--	--	--	**5**
Market Swine	20	6	--	1	--	**27**
Non-Formula-Fed Veal	--	59	--	--	--	**59**
Roaster Hogs	8	--	--	--	--	**8**
Sows	8	5	5	--	--	**13**
Steers	--	66	--	--	1	**70**
TOTAL	**47**	**1,305**	**5**	**1**	**5**	**1,363**

Table 27. 2012 Inspector-Generated Sampling Results: Distribution of Positive Non-Violative Residues by Chemical Residue and Project Name

Note: Multiple Positive non- violative residue results may be associated with a single sample (animal)

Chemical Residue	Project Name					Total
	FAST	KIS ™ Test	COLLGEN	SHOW	STATE	
Ampicillin		37	--	--	--	**37**
Chlortetracycline	4	13	--	--	1	**18**
Danofloxacin	--	3	--	--	--	**3**
Desacetyl Cephaprin	--	1	--	--	--	**1**
Desfuroylceftiofur Cystine Disulfide	--	107	--	--	--	**107**
Dexamethasone	--	21	--	--	--	**21**
Dihydrostreptomycin	--	9	--	--	--	**9**
Enrofloxacin	--	3	--	--	--	**3**
Florfenicol	--	9	--	--	--	**9**
Flunixin	--	40	--	--	--	**40**
Gamithromycin	--	8	--	--	--	**8**
Gentamycin—Sulfate	--	1	--	--	--	**1**
Lincomycin	--	2	--	--	--	**2**
Neomycin	--	200	1	--		**201**
Oxytetracycline	8	281	--	--	1	**290**
Penicillin	1	154	--	--	--	**155**
Pirlimycin	--	11	--	--	--	**11**
Ractopamine	--	5	3	--	--	**8**

Continued: **Table 27. 2012 Inspector-Generated Sampling Results:**
Distribution of Positive Non-Violative Residues by Chemical Residue and Project Name
Note: Multiple Positive non-violative residue results may be associated with a single sample (animal)

Chemical Residue	Project Name					Total
	FAST	KIS ™ Test	COLLGEN	SHOW	STATE	
Spectinomycin	--	29	--	--	--	**29**
Sulfadimethoxine	--	24	--	--	--	**24**
Sulfamethazine	1	8	--	--	--	**9**
Tetracycline	16	160	--	1	--	**177**
Tilmicosin	--	31	--	--	--	**31**
Tulathromycin	--	70	--	--	--	**70**
Tylosin	--	5	--	--	1	**6**
UMI	17	73	1	--	2	**93**
Total	**47**	**1,305**	**5**	**1**	**5**	**1,363**

Table 28: 2012 Inspector-Generated Sampling Results
Distribution of Positive but Non-Violative, By Chemical Residues, and Animal Class (Includes FAST and KIS™ Tests)
Note: Multiple positive but non-violative residue results may be associated with a single sample (animal)

Chemical Residue	Beef Cows	Bob Veal	Bulls	Dairy Cow	Formula-fed Veal	Goats	Heavy Calf	Heifer	Lamb	Market Swine	Non Formula - Fed Veal	Roaster Swine	Sows	Steers	Total
Ampicillin	--	--	--	35	1	--	--	--	--	--	--	--	--	1	**37**
Chlortetracycline	--	4	--	1	--	--	1	2	1	--	2	3	2	2	**18**
Danofloxacin	--	--	1	--	--	--	--	1	--	--	--	--	--	1	**3**
Desacetyl Cephaprin	--	--	--	1	--	--	--	--	--	--	--	--	--	--	**1**
Desfuroylceftiofur Cystine Disulfide	5	17	1	82	--	--	--	--	--	--	--	--	--	2	**107**
Dexamethasone	1	--	--	20	--	--	--	--	--	--	--	--	--	--	**21**
Dihydrostreptomycin	--	4	--	5	--	--	--	--	--	--	--	--	--	--	**9**
Enrofloxacin	--	--	--	2	--	--	--	--	--	1	--	--	--	--	**3**
Florfenicol	3	--	--	2	--	--	--	1	--	--	--	--	--	3	**9**
Flunixin	1	--	--	36	--	--	--	1	--	--	--	--	1	1	**40**
Gamithromycin	2	--	--	2	--	--	1	1	--	--	--	--	--	2	**8**
Gentamycin—Sulfate	--	--	--	--	--	--	--	--	--	--	--	--	1	--	**1**
Lincomycin	--	--	--	--	--	--	--	--	--	2	--	--	--	--	**2**
Neomycin	6	124	1	19	2	--	5	4	--	--	37	--	--	3	**201**
Oxytetracycline	46	142	8	73	--	--	6	2	3	1	2	1	1	5	**290**
Penicillin	19	7	--	125	--	--	--	--	--	--	--	--	1	3	**155**
Pirlimycin	1	5	--	5	--	--	--	--	--	--	--	--	--	--	**11**
Ractopamine	--	--	--	--	--	--	--	1	--	1	--	--	--	6	**8**

Continued: **Table 28. 2012 Inspector-Generated Sampling Results**
Distribution of Positive but Non-Violative, By Chemical Residue, and Animal Class (Includes FAST and KIS™ Tests)
Note: Multiple positive but non-violative residue results may be associated with a single sample (animal)

Chemical Residue	Beef Cows	Bob Veal	Bulls	Dairy Cow	Formula-fed Veal	Goats	Heavy Calf	Heifer	Lamb	Market Swine	Non Formula -Fed Veal	Roaster Swine	Sows	Steers	Total
Spectinomycin	1	6	2	19	1	--	--	--	--	--	--	--	--	--	**29**
Sulfadimethoxine	3	--	--	17	--	--	--	--	--	--	4	--	--	--	**24**
Sulfamethazine	3	--	--	3	--	--	--	--	--	1	1	--	--	1	**9**
Tetracycline	15	43	1	80	4	1	5	2	--	13	5	1	2	4	**177**
Tilmicosin	6	--	2	14	--	--	1	2	--	--	1	--	1	4	**31**
Tulathromycin	14	--	4	23	--	--	2	2	--	--	--	--	--	25	**70**
Tylosin	2	1	--	1	--	--	--	2	--	--	--	--	--	--	**6**
UMI	9	14	2	22	--	2	2	13	1	8	7	2	4	7	**93**
Total	**137**	**367**	**22**	**587**	**8**	**3**	**23**	**34**	**5**	**27**	**59**	**8**	**13**	**70**	**1,363**

IMPORT RESIDUE REINSPECTION SAMPLING RESULTS

Table 29: Samples analyzed under the import reinspection program.
Results are presented for imported products subject to normal reinspection. No violations were found in CY 2012.

Country	Number of Non-Detected	Number of non-violative positives	Number of Violations	Number of Exemptions	Number of Analyses
Argentina	10	0	0	0	10
Australia	133	0	0	26	159
Brazil	45	0	0	8	53
Canada	313	0	0	65	378
Chile	38	0	0	12	50
Costa Rica	63	0	0	4	67
Croatia	1	0	0	0	1
Denmark	25	0	0	2	27
Finland	10	0	0	0	10
France	2	0	0	1	3
Germany	0	0	0	1	1
Honduras	40	0	0	5	45
Ireland	21	0	0	4	25
Israel	7	0	0	0	7
Italy	1	0	0	0	1
Mexico	117	0	0	76	193
Netherlands	7	0	0	3	10
New Zealand	92	0	0	4	96
Nicaragua	44	0	0	8	52
Northern Ireland	6	0	0	1	7
Poland	8	0	0	4	12
San Marino	1	0	0	0	1
Spain	8	0	0	1	9
United Kingdom	12	0	0	1	13
Uruguay	65	0	0	4	69
TOTAL	**1,069**	**0**	**0**	**230**	**1,299**

Table 30: NRP Import Samples Analyzed, by Country and Animal Class

Country	Beef	Chicken	Pork	Other	*Total*
Argentina	10	-	-	-	10
Australia	115	-	-	44	159
Brazil	53	-	-	-	53
Canada	131	47	114	86	378
Chile	3	7	37	3	50
Costa Rica	67	-	-	-	67
Croatia	-	-	1	-	1
Denmark	-	-	27	-	27
Finland	-	-	10	-	10
France	-	-	3	-	3
Germany	-	-	1	-	1
Honduras	45	-	-	-	45
Ireland	-	-	25	-	25
Israel	-	3	-	4	7
Italy	-	-	1	-	1
Mexico	80	1	102	10	193
Netherlands	-	-	10	-	10
New Zealand	73	-	-	23	96
Nicaragua	52	-	-	-	52
Northern Ireland	-	-	7	-	7
Poland	-	-	12	-	12
San Marino	-	-	1	-	1
Spain	-	-	9	-	9
United Kingdom	-	-	13	-	13
Uruguay	69	-	-	-	69
Total	**698**	**58**	**373**	**170**	**1,299**

Table 31: **Samples analyzed under the import reinspection program, by Chemical Compounds**

Note: No violations were found in CY 2012.

Chemical Residue	Number of Non-Detected	Number of non-violative positives	Number of Violations	Number of Exemption [27]	Number of Analyses
Antibiotics	54	0	0	6	60
Arsenic	86	0	0	30	116
Arsenic & Avermectin	21	-	-	-	21
Arsenic & Chloramphenicol	1	-	-	-	1
Avermectin	237	0	0	18	255
Beta Agonist	242	0	0	127	369
Chloramphenicol	15	0	0	3	18
Florfenicol	6	0	0	1	7
Flunixin	11	0	0	2	13
Fluroquinolones	0	0	0	1	1
MRM	191	-	-	-	191
Pesticides	90	0	0	15	105
Sulfonamides	115	0	0	27	142
TOTAL	**1,069**	**0**	**0**	**230**	**1,299**

[27] Import products received that were not eligible for sampling; for example processed vs fresh product

Table 32: Samples analyzed under the import reinspection program, by chemical compound and animal class.

The 'other*' category may include lamb, veal, mutton, goat, and turkey. No violations were found.

Chemical Residue	Beef	Chicken	Pork	Other*	Total
Antibiotics	17	10	17	16	**60**
Arsenic	-	39	60	17	**116**
Arsenic and Avermectin	1	-	1	19	**21**
Arsenic and Chloramphenicol	-	1	-	-	**1**
Avermectin	239	-	-	16	**255**
beta-Agonist	104	-	205	60	**369**
Chloramphenical	1	8	-	9	**18**
Florfenicol	7	-	-	-	**7**
Flunixin	13	-	-	-	**13**
Fluroquinolones	1	-	-	-	**1**
MRM	146	-	28	17	**191**
Pesticides	101	-	-	4	**105**
Sulfonamides	68	-	62	12	**142**
Total	**698**	**58**	**373**	**170**	**1,299**

Table 33: Samples analyzed under the import reinspection program, by chemical compound and product type.

Chemical Residue	Fresh	Processed	Total
Antibiotics	60	-	**60**
Arsenic	106	10	**116**
Arsenic and Avermectin	21	-	**21**
Arsenic and Chloramphenicol	-	1	**1**
Avermectin	213	42	**255**
beta-Agonist	352	17	**369**
Chloramphenical	18	-	**18**
Florfenicol	7	-	**7**
Flunixin	13	-	**13**
Fluroquinolones	1	-	**1**
Multi-residue method	191	-	**191**
Pesticides	105	-	**105**
Sulfonamides	128	14	**142**
Total	**1,215**	**84**	**1,299**

Appendix I
FSIS Laboratory Analytical Methods

FSIS uses analytical methods to detect, identify, and quantify residues that may be present in meat, poultry, and processed egg products. The Agency uses these methods for monitoring and surveillance activities to determine product adulteration and for human risk assessment evaluations. The Agency uses available methodologies to take appropriate regulatory action against adulterated products in a manner consistent with the reliability of the analytical data. The table below lists the analytical methods and provides links to each method.

Compound	Method	Species	Tissue
Aminoglycosides	CLG-AMG2	bovine, porcine, poultry	kidney, liver, muscle
Antibiotics	MLG-34.03	meat and poultry	kidney, liver, muscle
Avermectins	CLG-AVR	bovine, porcine, ovine, caprine, equine	liver, muscle
Beta-Agonists	CLG-AGON1.03	bovine, porcine, ovine, caprine bovine, porcine	liver muscle
	CLG-RAC1.01	bovine, porcine	liver, muscle
Beta-lactams	CLG-BLAC.03	bovine, porcine	kidney, muscle
Carbadox	CLG-CBX4	pork	liver
Chloramphenicol	CLG-CAM1.02 CLG-CAM.05	beef, poultry, swine beef, poultry	muscle muscle
Florfenicol	CLG-FLOR1	bovine, poultry	liver, muscle
Flunixin	CLG-FLX4.03	Bovine, porcine	liver, muscle
Fluoroquinolones	CLG-FLQ2.00	bovine	liver, muscle
Macrolides	CLG-MAL1.02	beef, pork, poultry	kidney, liver, muscle
Metals	CLG-TM3.03 CLG-TM4.01 CLG-ARS.04	beef, pork, poultry meat and food products all animal species, egg products	kidney, liver, muscle kidney, liver, muscle kidney, liver, muscle
MRM (multi-residue method)	CLG-MRM 1.02	beef, pork	Kidney, muscle
Nitrofurans	CLG-NFUR2.01	bovine, porcine, poultry	liver
Pesticides*	CLG-PST5.02	chicken, pork, beef	muscle
Phenylbutazone	CLG-PBZ2.03	beef	kidney
Sulfonamides	CLG-SUL	porcine, bovine, avian, caprine, ovine, processed products	liver, muscle
Tetracyclines	CLG-TET2.04	bovine, porcine, ovine poultry	kidney, liver, muscle kidney, muscle
Tilmicosin	CLG-TIL1.02	bovine	kidney, liver, muscle
Zeranol	CLG-ANA.02	ovine, bovine	liver, muscle

APPENDIX II

Statistical Table

Table AII indicates the number of samples required to ensure detection of a violation that affects a given percentage of the sampled population. Statistically, for a binomial distribution with sample size "*n*" and violation rate "*v*" (in decimal number), if *v* is the true violation rate in the population and *n* is the number of samples, the probability, *p*, of finding at least one violation among the *n* samples (assuming random sampling) is $p = 1-(1-v)^n$. Therefore, if the true violation rate is **1%** (i.e., 0.01), the probabilities of detecting at least one violation with sampling levels of 230 and 300 are 0.90 and 0.95, respectively.

On the other hand, if the true violation rate is **0.57%** (i.e., 0.0057), the probabilities of detecting at least one violation with sampling levels of 400 and 525 are 0.90 and 0.95, respectively. Similarly, if the true violation rate is **0.29%** (i.e., 0.0029), the probabilities of detecting at least one violation with sampling levels of 800 and 1,030 are 0.90 and 0.95, respectively.

Table AII. Statistical Table - 2012 National Residue Program

Percentage % Violative in the Sample (*v*)	Probability (*p*) of detecting at least one violation in (*n*) samples	
	0.90	**0.95**
10	22	29
5	45	59
1	230	300
0.57	400	525
0.50	460	598
0.29	800	1,030
0.10	2,302	2,995
0.05	4,605	5,990

Procedure to calculate the required sample size:

$1 - p = (1 - v)^n$ ← Subtract one from both side of the equation

$\log(1 - p) = \log(1 - v)^n$ ← Apply logarithmic function to both side of the equation

$\log(1 - p) = n * \log(1 - v)$ ← A logarithmic function property

$n = \frac{\log(1 - p)}{\log(1 - v)}$ ← Sample size based on violation rate (*v*) and probability of detecting (*1-p*)