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

2010 RESIDUE SAMPLE RESULTS

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

June 2012

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

FSIS would like to acknowledge Dr. Pat Basu, Senior Leader – Chemistry, Toxicology and Related Sciences, Dr. Emilio Esteban, Executive Associate for Laboratory Services, Dr. Alice Thaler, Senior Director for Program Services, Office of Public Health Science (OPHS); Ms. Janell Kause, Risk Assessment Division Director; and Dr. Patty Bennett, Risk Assessment Division Deputy Director (OPHS). These individuals advised the working team for this project. FSIS would like to thank Ms. Gail Graves (OPHS) and Ms. Lily Thienard, Office of the Chief Information Officer (OCIO). In addition, FSIS would like to thank Ms. Margaret O'Keefe, Chemical Residue Risk Staff, Risk Assessment Division, and give a special thanks to Dr. Deep Saini from the Office of Data Integration and Food Protection/Data Analysis and Integration Group (DAIG) for his technical and data support.

FSIS would like to thank the Agency's field inspection personnel who collected and submitted domestic residue samples. The 2010 sampling and testing program operations were carried out with the support of the 15 FSIS Office of Field Operations (OFO) district offices located in Alameda, CA; Albany, NY; Atlanta, GA; Beltsville, MD; Chicago, IL; Dallas, TX; Denver, CO; Des Moines, IA; Jackson, MS; Lawrence, KS; Madison, WI; Minneapolis, MN; Philadelphia, PA; Raleigh, NC; and Springdale, AR. FSIS also would like to thank the FSIS Import Inspection Division, Office of International Affairs that oversees 117 import facilities at U.S. ports of entry to ensure that imported meat, poultry, and egg products that are sent into U.S. commerce are safe, wholesome, and properly labeled.

Additionally, FSIS would like to thank the Agency's laboratory staff located at Eastern Laboratory in Athens, GA, the Midwestern Laboratory in St. Louis, MO; and the Western Laboratory in Alameda, CA, who prepared and analyzed the residue samples and documented the results. FSIS Field Services Laboratories coordinate and conduct laboratory analytical services in support of the Agency's strategy to maintain food safety in meat, poultry, and egg products along the farm-to-table continuum.

Furthermore, 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 U.S. National Residue Program (NPR). Finally, FSIS would like to thank all of the agencies that submitted feedback and recommendations on enhancing the format and the content of the National Residue Program for Meat, Poultry, and Egg Products: Residue Sample Results publication (i.e., the Red Book).

CONTACTS AND COMMENTS

The Chemical Residue Risk Staff (CRRS), Risk Assessment Division (RAD), Office of Public Health Science, FSIS, USDA, coordinated this effort and is responsible for the publication of this material. Questions about the U.S. NRP should be directed to:

USDA/FSIS/RAD/CRRS
1400 Independence Avenue, SW
355 E Street - Patriot Plaza III
Washington, D.C. 20250-3700
Telephone: (202) 690-6409
Fax: (202) 690-6337
E-mail: ChemicalResidue@fsis.usda.gov
Web site: www.fsis.usda.gov/Science/Chemistry/index.asp

PRINCIPAL AUTHORS (USDA/FSIS/OPHS/RAD/CRRS)

Mr. Naser Abdelmajid
Dr. Sarah Edwards
Mr. Alex Domesle

EXECUTIVE SUMMARY

2010 United States National Residue Program Data

The 2010 United States National Residue Program for meat, poultry, and egg products (U.S. NRP), an interagency chemical testing program administered by FSIS, examined food samples for the presence of 128 chemical compounds, including 78 veterinary drugs, 45 pesticides, and 5 environmental contaminants. All food samples were analyzed at one of three FSIS International Standardization Organization 17025 (ISO)-accredited laboratories: the Eastern Laboratory in Athens, GA; the Midwestern Laboratory in St. Louis, MO; and the Western Laboratory in Alameda, CA.

The domestic sampling program of the U.S. NRP comprises scheduled sampling and inspector-generated sampling. The majority of violations detected by the 2010 domestic scheduled sampling plan were veterinary drugs, particularly sulfonamides and antibiotics 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. Detected residues are usually concentrated in kidney and liver tissue rather than in muscle tissue. Of the 211,733 samples analyzed in 2010, there were 1,632 violations: 23 from scheduled sampling and 1,609 from the inspector-generated program.

FSIS field personnel collected 18,374 samples under the domestic scheduled sampling program, representing 60 compounds in 23 animal product classes. No residues were detected in 96% of the domestic scheduled samples. The domestic scheduled sampling program reported 23 residue violations: beef cows (2), boars/stags (3), bob veal (4), bull (1), dairy cows (2), goats (6), market hogs (2), roaster pig (1), sow (1), and steer (1). The 23 violations were distributed among the following compounds and compound classes: avermectins (7); sulfonamides (4); pesticides (4); antibiotics, unspecified (5); flunixin (2); florfenicol (1).

Besides the 23 residue violations, the domestic scheduled sampling program identified 144 samples with non-violative positive residue levels. These are samples that tested positive for presence of residue, but at levels below the tolerance. Under the domestic scheduled sampling program, Unidentified Microbial Inhibitors (UMIs) comprised the highest percentage of non-violative positives (29% of the 144 non-violative positive samples), followed by tetracycline (17%) and ivermectin (15%). Rabbits, mature turkeys, and veal had the highest number of positive non-violative results.

Under the inspector-generated program, FSIS inspection program personnel collected 211,733 samples. The in-plant inspector selects a carcass for sampling based on professional judgment and public health criteria outlined in FSIS Directives 10,800.1 and 10,220.3. FSIS labs reported 2,043 residue violations in 1,609 animals (a single animal may have multiple violations): beef

cows (84), bob veal (765), bulls (8), dairy cows (700), formula fed veal (3), goat (1), heavy calves (5), heifers (10), market hogs (3), non-formula fed veal (7), and steers (23). Neomycin accounted for the most residue violations across the inspector-generated program (520 or 25%), followed by flunixin (285 or 14%) and penicillin (281 or 14%).

Besides the 2,043 residue violations, there were 4,215 samples reported as non-violative positives. Again, neomycin accounted for the highest percentage of non-violative positive samples (1,884 or 45%), followed by dihydrostreptomycin (487 or 12%) and tetracycline (516 or 12%). Bob veal, dairy cows, and beef cows had the highest number of positive non-violative results.

The inspector-generated samples are screened in plants using either the Fast Antimicrobial Screening Test (FAST) or the Kidney Inhibition Swab (KIS™) test. Positive samples are sent to FSIS Midwestern laboratory for confirmation or initial analysis. FAST kits detected 58 (3%) of 2,043 total inspector-generated violation samples, compared to 1,926 (94%) of 2,043 violations detected by the KIS™ test kits. The remaining 3 % of violations comprise collector-generated samples and samples from show animals. Out of 4,215 non-violative positive samples analyzed under inspector-generated samples, 3,882 (92%) were detected with KIS™ tests, compared to 201 (5%) detected using the FAST screen. The remaining 3% of violations comprise collector-generated samples and samples from show animals and individual states.

FSIS plans and administers an import reinspection program as part of the NRP. After the U.S. Customs Service and the USDA Animal and Plant Health Inspection Service (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 establishments. In 2010, the import sampling program analyzed 121 chemical residues from 13 compound classes of veterinary drugs and pesticides. Of the 2,843 samples analyzed, 24 violations were detected—all from the veterinary drug avermectin.

FSIS continually strives to improve methods for reporting the U.S. NRP data. These reports are publicly available online on the FSIS Web site at **www.fsis.usda.gov/Science/Chemistry/index.asp**. Interested parties may contact the FSIS Chemical Residue Risk Staff at (202) 690-6409 for additional copies of the annual report.

ACRONYMS

ADRS – Automated Disposition Reporting System

AIIS – Automated Imported 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

CRRS – Chemical Residue Risk Staff

CVM – Center for Veterinary Medicine

DAIG – Data Analysis and Integration Group

DCA – Desfuroylceftiofur Acetamide

DCCD – Desfuroylceftiofur Cysteine Disulfide

DW – FSIS Data Warehouse

FAST – Fast Antimicrobial Screening Test

FDA – Food and Drug Administration

FSIS – Food Safety and Inspection Service

EPA – Environmental Protection Agency

HACCP – Hazard Analysis and Critical Control Points

KIS™ test – Kidney Inhibition Swab Test

LEARN – Laboratory Electronic Application for Results Notification

LIMS – Laboratory Information Management System

MARCIS – Microbiological and Residue Computer Information System

NASS – National Agricultural Statistics Service

ND – Non-detect

NRP – National Residue Program (Domestic & Import)

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

RAD – Risk Assessment Division

RVIS – Residue Violation Information System

SAT – Surveillance Advisory Team

STATE – State or Government Agency Testing

SHOW – Show Animals

SULFAS – Sulfonamides compounds

TOI – Type of Inspection

INTRODUCTION

The 2010 United States National Residue Program (U.S. NRP) for Meat, Poultry, and Egg Products: Residue Sample Results (Red Book) provides the residue sampling results from testing for chemical compounds in food animals produced domestically or imported into the United States.

The NRP requires the cooperation and collaboration of several agencies for its successful design and implementation. The Food Safety and Inspection Service (FSIS), the Environmental Protection Agency (EPA), and the Department of Health and Human Services' Food and Drug Administration (FDA) are the primary federal agencies managing this program. The FDA, under the Federal Food, Drug, and Cosmetic Act, establishes tolerances or action levels for veterinary drugs, 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.

A scheduled sampling program is developed annually by representatives from FSIS, FDA, EPA, the USDA Agricultural Research Service (ARS), the USDA Agricultural Marketing Service (AMS) and the Centers for Disease Control and Prevention (CDC). These agencies work together to create the annual sampling plan using NRP results, FDA veterinary drug inventories completed during on-farm visits and information from investigations. The agencies establish a relative ranking for the chemicals, determine the production classes of public health concern and evaluate FSIS laboratory capacity and analytical methods. FSIS publishes the finalized sampling plan in the U.S. NRP Sampling Plans for Meat, Poultry, and Egg Products, referred to as the Blue Book.

Chemical compounds tested in the program include approved and unapproved veterinary drugs, pesticides and environmental contaminants. 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) collect and report results; (4) identify the need for regulatory follow-up when violative levels of chemical residues are found.

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 (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 establishments and to prevent the distribution in commerce of any such products that are adulterated or misbranded.

Since 1967, FSIS has administered the NRP by collecting samples from meat, poultry, and egg products and analyzing the samples for specific chemical compounds at one of three FSIS

laboratories. A violation occurs when an FSIS laboratory detects a chemical compound level in excess of an established tolerance or action level. FSIS informs the producer, via certified letter, 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 not corrected, can enforce legal action.

FSIS posts a weekly Residue Repeat Violator List, identifying producers with more than one violation on a rolling 12-month basis. These lists provide helpful information to processors and producers working to avoid illegal levels of residues, serve as deterrents for violators, and enable 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.

In the late 1990s, FSIS implemented the Hazard Analysis and Critical Control Points (HACCP) inspection system in all federally inspected establishments. The HACCP regulation (9 CFR 417) requires FSIS-inspected slaughter and processing establishments to identify all food safety hazards reasonably likely to occur before, during, and after entry into the establishment. The regulation also requires that the establishments determine preventive measures to control these hazards. FSIS takes regulatory action against establishments that do not have an adequate chemical residue control program in place.

SAMPLING PLANS OF THE U.S. NATIONAL RESIDUE PROGRAM FOR MEAT, POULTRY, AND EGG PRODUCTS

The NRP sampling plans focus on chemical residues in domestic meat, poultry and egg products and in import reinspection of meat and poultry products. The domestic sampling plan includes scheduled sampling and inspector-generated sampling. The import reinspection sampling plan encompasses normal sampling, increased sampling, and intensified sampling. For detailed sampling plan instructions, see FSIS Directive 10,800.1, *Procedures for Residue Sampling, Testing, and Other Responsibilities for the National Residue Program*.

DOMESTIC SAMPLING PLAN: Scheduled Sampling

Scheduled sampling plans involve random tissue sampling from food animals that have passed ante-mortem inspection. The development of scheduled sampling plans proceeds in the following manner: 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 animal and egg products; and 4) establish the number of samples to be collected.

The Surveillance Advisory Team (SAT), an interagency committee comprising 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 violative levels. The resulting violation data are used to verify whether industry process controls and HACCP plans effectively control residues. The FSIS, FDA, and EPA review and make final adjustments to the plan.

Within the domestic sampling plan, there are two major types of assessments: continuous baseline and targeted sampling.

Continuous Baseline Assessments determine the prevalence of chemical residues in the nation's food supply. Sample results are used to:

- guide FSIS decisions to condemn carcasses with violative levels of residues
- guide FDA regulatory decisions when a sample contains violative levels of residues to determine action against producers
- guide industry decisions to retain product until the sample has been tested
- guide industry decisions to recall a product that was not retained while the sample was tested and found to contain violative levels of residue

Targeted Sampling Assessments allow us to react to the violations obtained from previous baseline assessments and intelligence information. Sample results are used to:

- reinvestigate animal populations from ongoing or previous baseline assessments if the violation rate is confirmed at 1% or greater
- investigate animal populations when the compounds in question have no established tolerances
- respond to intelligence reports from the field regarding use of veterinary drugs, pesticides and environmental contaminants

DOMESTIC SAMPLING PLAN: Inspector-Generated Sampling

Inspector-generated sampling is conducted by in-plant Public Health Veterinarians (PHVs) when the PHV suspects that an animal may have violative levels of chemical residues. Currently, inspector-generated sampling targets *individual suspect animals* and *suspect populations of animals*. When an inspector-generated sample is collected, the carcass is held pending the results of laboratory testing. If a carcass is found to contain violative levels of residues, the carcass is condemned. Additionally, FSIS keeps a weekly list of establishments with repeat violations. Click here to access the weekly repeat violator list.

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 Directives 10,800.1 and 10,220.3 (i.e., animal disease signs and symptoms, producer history, or results from random scheduled sampling). Some samples are screened in the plant by the Inspector-in-Charge (IIC) and verified when necessary by a PHV. Other samples are sent directly to the laboratory for analysis. For example, if the IIC suspects the misuse of a veterinary drug in an animal, he/she can perform the relevant in-plant screening test. If the result of a screening test is positive, the sample is sent to an FSIS laboratory for confirmation.

Sampling for suspect animal populations

Sampling for suspect animal populations is directed by a FSIS regulation, directive, or notice.

Actions taken on violations

A violation occurs when an FSIS laboratory detects a residue that exceeds an established tolerance or action level. Once the laboratory analysis is complete, FSIS enters the residue violation into the Residue Violation Information System (RVIS), an FSIS/FDA interagency database. FDA accesses the violative sample results, and, because FDA has on-farm jurisdiction, evaluates the appropriate action to take on the violation. These actions range in severity from returning to the farm for re-education to taking legal action.

IMPORT REINSPECTION SAMPLING PLAN

Imported meat, poultry, and egg products are sampled through the Port-of-Entry Reinspection Program, 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) is conducted on every lot of 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 from a lot)
- Increased sampling (above-normal sampling as the result of an Agency management decision)
- Intensified sampling (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 Automated Import Information System (AIIS), an FSIS database designed to generate reinspection assignments, receive and store results, and compile histories for the performance of foreign establishments certified by the inspection system in the exporting country.

Estimated Livestock, Poultry, and Egg Products

Table 1 presents the number of head slaughtered or pounds of eggs processed, pounds per animal (dressed weight), total pounds (dressed weight), and the percent estimated relative consumption of domestic and exported product for each production class.

Table 1. 2010 Estimated Consumption Data by Production Class

Production Class	Number of Head Slaughtered[1]	Pounds per Animal (dressed weight)[2]	Total Pounds (dressed weight)	Percent Estimated Relative Consumption
Bulls	636,271	875	556,737,125	0.502%
Beef cows	3,638,008	607	2,208,270,856	1.992%
Dairy cows	2,820,225	607	1,711,876,575	1.544%
Heifers	10,042,691	768	7,712,786,688	6.956%
Steers	16,577,057	835	13,841,842,595	12.484%
Bob veal	450,785	75	33,808,875	0.030%
Formula-fed veal	367,788	245	90,108,060	0.081%
Non-formula-fed veal	11,653	350	4,078,550	0.004%
Heavy calves	42,096	400	16,838,400	0.015%
SUBTOTAL, BOVINE	**34,586,574**		**26,176,347,724**	**23.609%**
Market hogs	105,237,779	204	21,468,506,916	19.363%
Roaster pigs	720,167	70	50,411,690	0.045%
Boars/Stags	411,058	201	82,622,658	0.075%
Sows	2,996,622	305	913,969,710	0.824%
SUBTOTAL, PORCINE	**109,365,626**		**22,515,510,974**	**20.307%**
Lambs	154,532	69	10,662,708	0.010%
Sheep	2,096,583	65	136,277,895	0.123%
Goats	605,278	50	30,263,900	0.027%
SUBTOTAL, OTHER	**2,856,393**		**177,204,503**	**0.160%**
Bison	52,858	607	32,084,806	0.029%
TOTAL, ALL LIVESTOCK	**146,861,451**		**48,901,148,007**	**44.104%**
Young chickens	8,676,848,876	Not Reported	49,413,242,779	44.566%
Mature chickens	141,004,196	Not Reported	805,719,873	0.727%
Young turkeys	241,882,882	Not Reported	7,027,002,908	6.338%
Mature turkeys	1,434,115	Not Reported	38,297,443	0.035%
Ducks	23,637,893	Not Reported	162,695,418	0.147%
Geese	222,248	Not Reported	3,132,780	0.003%
Other fowl (includes ratites)	2,300,299	Not Reported	2,540,489	0.002%
SUBTOTAL, POULTRY	**9,087,330,509**		**57,452,631,690**	**51.817%**
Rabbits	225,550	Not Reported	1,121,584	0.001%
Egg Products	Not Applicable	Not Applicable	4,521,355,458[3]	**4.078%**
GRAND TOTAL in LBS, ALL PRODUCTION CLASSES			**110,876,256,739**	**100%**

[1] Number of heads is obtained from the Animal Disposition Reporting System (ADRS).

[2] Average dressed weights are obtained from the publication, "Livestock Slaughter 2010 Summary," National Agricultural Statistics Service (NASS), April 2011. When the average weight is not available, an average weight based on the previous calendar year's data was imputed.

[3] Fiscal Year 2011

Definitions of FSIS 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 definitions are under FSIS review.
- Dairy cows are mature female cattle bred for milk production, ordinarily having given birth to one or more calves.
- Heifers are young, female cattle 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 are 200 to 300 pounds live weight.
- Roaster pigs are animals of both sexes and any age marketed with the carcass unsplit and with the head intact.
- 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 are yolks, whites, or whole eggs after breaking and 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, usually more than 15 months of age.
- Other poultry include ratites (typically ostriches, emus, and rheas), guineas, squabs (young, unfledged pigeons), adult pigeons, pheasants, grouse, partridge, quail, etc.
- Young chickens include broilers/fryers birds of both sexes, usually less than 10 weeks of age.
- Roasters are birds of both sexes usually less than 12 weeks of age; and 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 3-6 months of age

Other

- Goats are animals of both sexes and any age.
- Lambs are defined as sheep younger than 14 months and having a break joint in at least one leg.
- Other livestock include bison, deer, and elk, which are under voluntary inspection.
- Rabbits are any of several lagomorph mammals of both sexes, any age, and are under voluntary inspection.
- Sheep are mature animals of both sexes.

SUMMARY OF DOMESTIC DATA

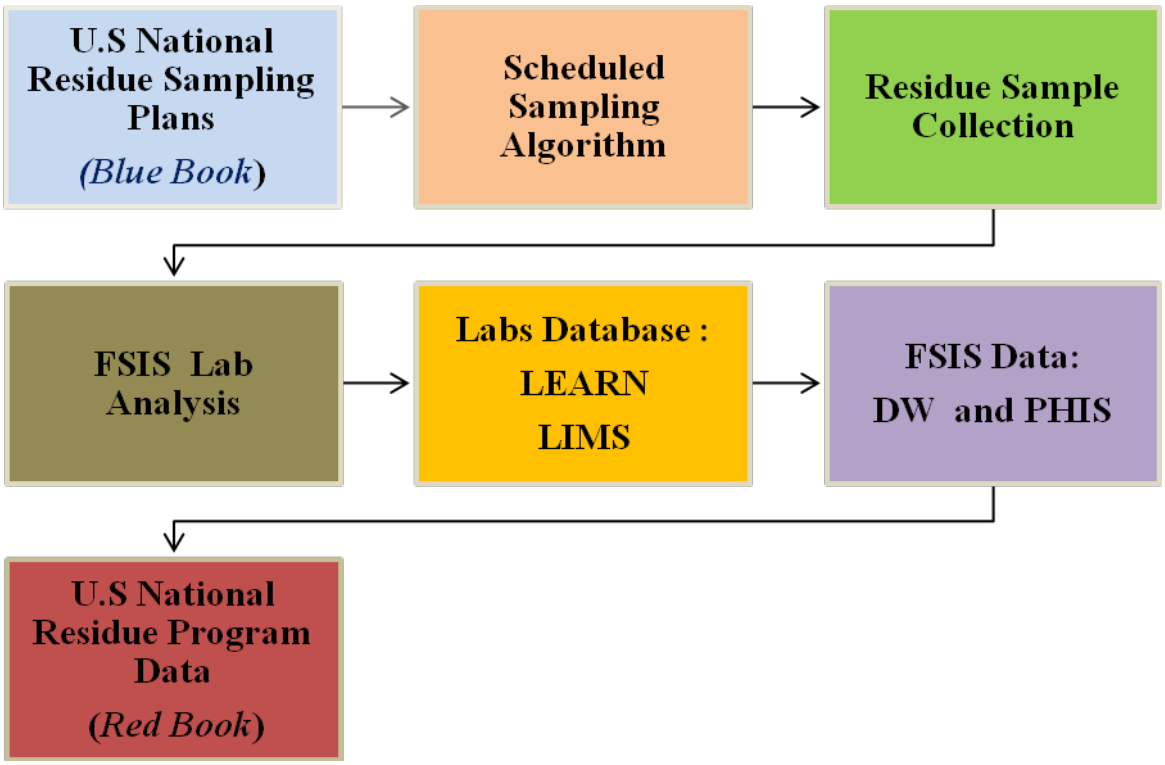
Scheduled Sampling

Sampling for Baseline Assessments

In 2010, FSIS laboratories analyzed food animal samples for 128 chemical compounds of veterinary drugs and pesticides. Of the 18,374 samples analyzed under domestic scheduled sampling, the NRP identified 23 chemical residue violations: antibiotics (5), avermectins/milbemycins (7), pesticides (PBDE) (4), sulfonamides (4), flunixin (2), and florfenicol (1).

FSIS laboratories found no residue violations for arsenic, *beta*-Agonists, carbadox, chloramphenicol, nitrofurans, nitroimidazoles, thyreostats, trenbolone, and zeranol.
This section reports the summary results from the domestic scheduled sampling plan by production class and compound class. Tables 2 and 3 display the number of samples, number of violations, and number of non-violative positives (residues detected at levels below the tolerances) for each production class.

Figure 1. U.S. NRP Domestic Scheduled Samples Flow Chart



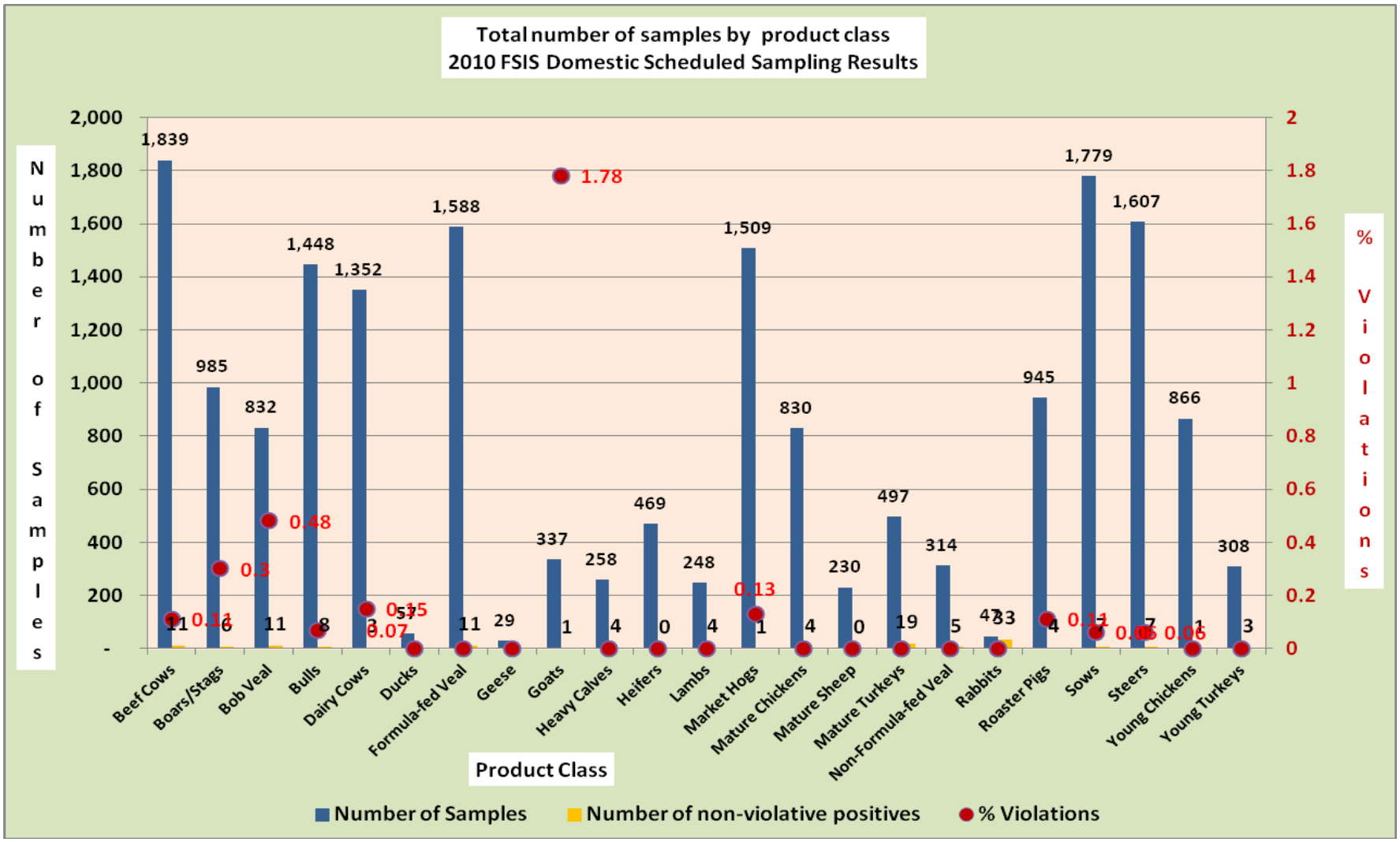
Note: The residue sample results with violation also are reported in RVIS.

Production Class

Table 2. Total Number of Samples by Production Class
2010 Domestic Scheduled Sampling Plan

Production Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Beef Cows	1,839	11	2	0.11
Boars/Stags	985	6	3	0.30
Bob Veal	832	11	4	0.48
Bulls	1,448	8	1	0.07
Dairy Cows	1,352	3	2	015
Ducks	57	-	-	0.00
Formula-fed Veal	1,588	11	-	0.00
Geese	29	1	-	0.00
Goats	337	1	6	1.78
Heavy Calves	258	4	-	0.00
Heifers	469	-	-	0.00
Lambs	248	4	-	0.00
Market Hogs	1,509	1	2	0.13
Mature Chickens	830	4	-	0.00
Mature Sheep	230	-	-	0.00
Mature Turkeys	497	19	-	0.00
Non-Formula-fed	314	5	-	0.00
Rabbits	47	33	-	0.00
Roaster Pigs	945	4	1	0.11
Sows	1,779	7	1	0.06
Steers	1,607	7	1	0.06
Young Chickens	866	1	-	0.00
Young Turkeys	308	3	-	0.00
TOTAL	**18,374**	**144**	**23**	**0.13**

Figure 2. Total Number of Samples and Violation Rate by Production Class
2010 Domestic Scheduled Sampling Plan

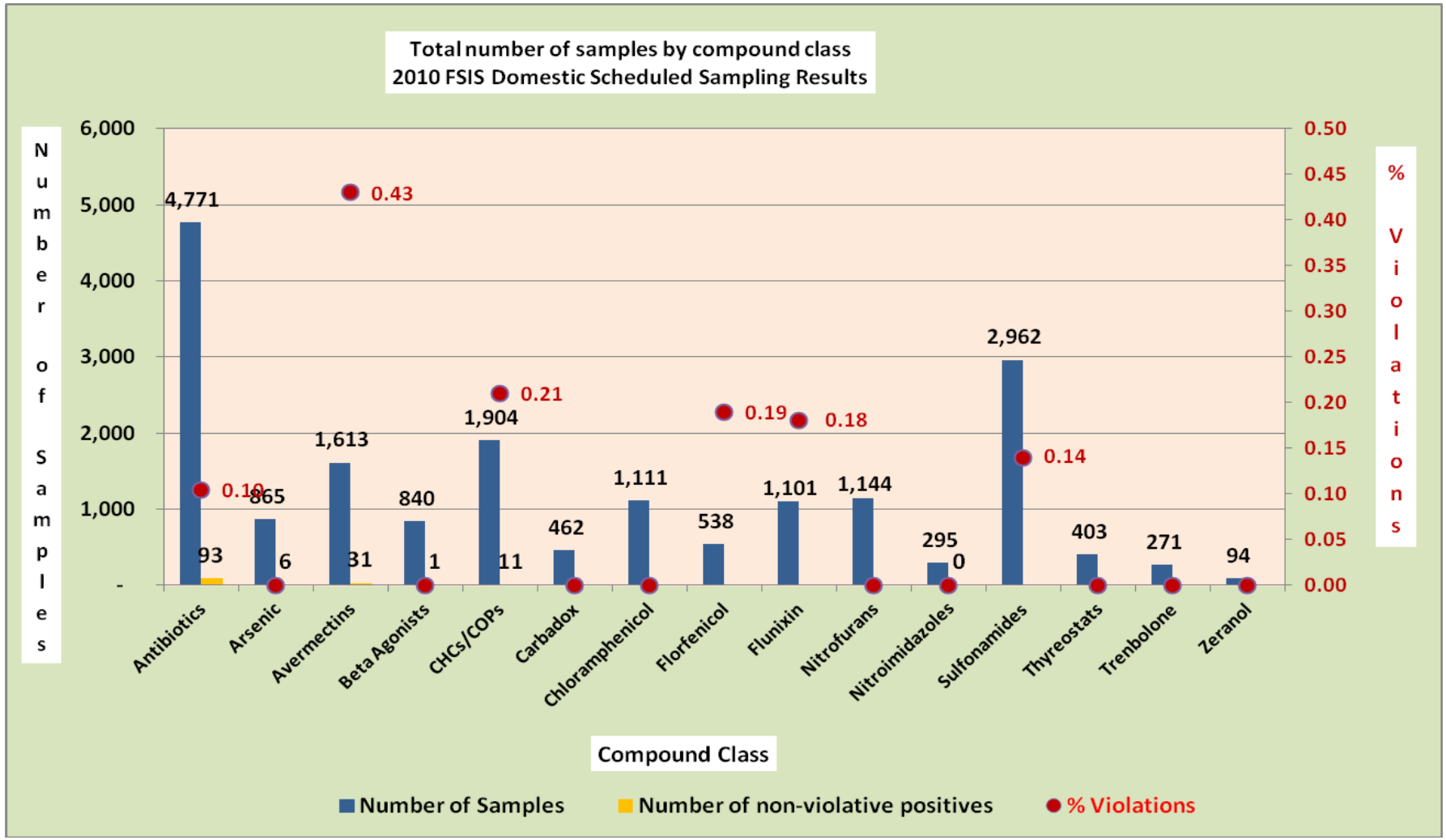


Compound Class

Table 3. Total Number of Samples by Compound Class
2010 Domestic Scheduled Sampling Plan

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	4,771	93	5	0.10
Arsenic	865	6	-	0.00
Avermectins	1,613	31	7	0.43
beta-Agonists	840	1	-	0.00
Pesticides	1,904	11	4	0.21
Carbadox	462	-	-	0.00
Chloramphenicol	1,111	-	-	0.00
Florfenicol	538	1	1	0.19
Flunixin	1,101	1	2	0.18
Nitrofurans	1,144	-	-	0.00
Nitroimidazoles	295	-	-	0.00
Sulfonamides	2,962	-	4	0.14
Thyreostats	403	-	-	0.00
Trenbolone	271	-	-	0.00
Zeranol	94	-	-	0.00
TOTAL	**18,374**	**144**	**23**	**0.13**

Figure 3. Total Number of Samples and Violation Rate by Compound Class
2010 Domestic Scheduled Sampling Results



Targeted Assessments

Environmental Contaminants — FSIS inspectors submitted samples from 296 dairy cows for cadmium and lead testing. The results of the analysis are reported on pages 72-73.

Inspector-Generated Sampling

Sampling for Suspect Animals

Of the 211,733 samples analyzed, FSIS found 2,043 chemical residue violations in 1,609 animals. The residue violations consisted of 89 (4%) desfuroylceftiofur cysteine disulfide (DCCD), 382 (19%) sulfas, 285 (14%) flunixin, 520 (25%) avermectins, and 767 (38%) antibiotics.

Sampling for Suspect Populations

For some populations of animals, like bob veal and show animals, there are regulatory requirements for testing these populations as part of the inspector-generated program.

The FSIS laboratory used FAST to analyze 5,568 samples from bob veal calves for antibiotics and sulfonamides. These are samples that tested positive in the plants and were sent to the laboratories for confirmation. Bob veal calf testing included samples from both the suspect population and suspect animals. FSIS laboratories confirmed 25 violations in 23 animals. The residue violations consisted of flunixin (2), gentamycin sulfate (6), neomycin (11), oxytetracycline (1), sulfamethazine (1), and sulfamethoxazole (4).

FSIS laboratories used KIS™ tests to screen 57,609 samples from bob veal calves (suspect animals and populations) for antibiotics and sulfonamides. These are samples that tested positive in the plants and were sent to the laboratories for confirmation. Of the animals tested, FSIS laboratory confirmed 916 violations in 735 animals. The residue violations consisted of ampicillin (1), DCCD (11), dihydrostreptomycin (5), flunixin (56), gentamycin sulfate (90), neomycin (475), oxytetracycline (21), penicillin (20), sulfadiazine (3), sulfadimethoxine (32), sulfamethazine (39), sulfamethoxazole (43), sulfathiazole (2), tetracycline (21), tilmicosin (27), tulathromycin (66), and tylosin (4).

Show Animals

FSIS laboratories conducted analyses for antibiotics and sulfonamides on two lambs, one market hog, and eight steers and detected no violations. FSIS laboratories conducted analyses for clenbuterol, salbutamol, ractopamine, and cimaterol (*beta*-Agonists) on 1 beef cow, 1 dairy cow, 1 goat, 2 heifers, 6 lambs, 14 market hogs, and 15 steers. There were no violations.

Table 4. Number of Samples Tested by Production Class
2010 Domestic Sampling Plan (Scheduled and Inspector-Generated)
This table refers to KIS™, FAST, and COLLGEN samples (not including SHOW or STATE)

Production Class	Scheduled Samples Baseline Assessments	Scheduled Samples Targeted Assessments	Inspector-generated Samples, Suspect Animals
Beef Cows	1,839	-	17,022
Boars/Stags	985	-	417
Bob Veal	832	-	63,196[4]
Bovine	-	-	-
Bulls	1,448	-	2,035
Dairy Cows	1,352	592	95,921
Ducks	57	-	-
Formula-fed Veal	1,588	-	1,864
Geese	29	-	-
Goats	337	-	475
Heavy Calves	258	-	408
Heifers	469	-	3,341
Lambs	248	-	1,477
Market Hogs	1,509	-	13,080
Mature Chickens	830	-	-
Mature Sheep	230	-	346
Mature Turkeys	497	-	-
Non-formula-fed	314	-	270
Rabbits	47	-	-
Roaster Pigs	945	-	770
Sows	1,779	-	4,216
Steers	1,607	-	6,819
Young Chickens	866	-	-
Young Turkeys	308	-	-
Other[5]	-	-	9
Total	**18,374**	**592**	**211,665**

[4] The total population analyzed includes both the suspect population and suspect animals.
[5] Others: other minor production classes.

Table 5. Number of Samples Tested by Compound Class
2010 Domestic Sampling Plan (Scheduled and Inspector-Generated)
This table refers to KIS™, FAST, and COLLGEN samples (not including SHOW or STATE)

Compound Class	Scheduled Samples, Baseline Assessments	Scheduled Samples, Targeted Assessments	Inspector-Generated Samples, Suspect Animals
Antibiotics (7-plate bioassay)	4,771	-	-
Antibiotics, Sulfonamides	-	-	270
Antibiotics, Sulfonamides, Flunixin, Phenylbutazone	-	-	211,395
Arsenic	865	-	-
Avermectins	1,613	-	-
beta-Agonists	840	-	-
Cadmium	-	296	-
Carbadox	462	-	-
CHCs/COPs	1,904	-	-
Chloramphenicol	1,111	-	-
Florfenicol	538	-	-
Flunixin	1,101	-	-
Lead	-	296	-
Nitrofurans	1,144	-	-
Nitroimidazoles	295	-	-
Sulfonamides	2,962	-	-
Thyreostats	403	-	-
Trenbolone	271	-	-
Zeranol	94	-	-
Total	**18,374**	**592**	**211,665**

Summary of Import Data

The United States imported approximately 3,128,908,578 (3.13 billion) pounds of fresh and processed meat, poultry, and egg products. These products were imported from 29 of the 33 countries eligible for exportation to the United States[6]. All egg products (over 21 million pounds) were imported from Canada. The import testing program included analysis of approximately 121 chemical residues from 13 compound classes of veterinary drugs and pesticides. Of 2,843 samples analyzed, 24 violations of avermectin were detected.

Normal

Thirteen compound classes of veterinary drugs and pesticides were tested. Of the 2,789 samples analyzed, 22 violations of avermectin were detected.

Increased

Five samples were tested for avermectin and pesticides and detected zero violations.

Intensified

Of the 49 samples analyzed, 2 avermectins violations were detected.

[6] The 29 of the 33 countries that were eligible for import are the following: Argentina, Australia, Austria, Brazil, Canada, Chile, Costa Rica, Croatia, Denmark, Finland, France, Germany, Honduras, Hungary, Iceland, Ireland, Israel, Italy, Japan, Mexico, Netherlands, New Zealand, Nicaragua, Northern Ireland, Poland, Spain, Sweden, United Kingdom, and Uruguay. Note: United Kingdom includes England, Scotland, and Wales, which are under one inspection system, as well as Northern Ireland, which is under a separate inspection system and is listed separately.

Source: Office of International Affairs; Food Safety and Inspection Service
www.fsis.usda.gov/pdf/import_summary_2010.pdf

Figure 4. 2010 Imported Meat and Poultry Products by Country (% of total net weight)

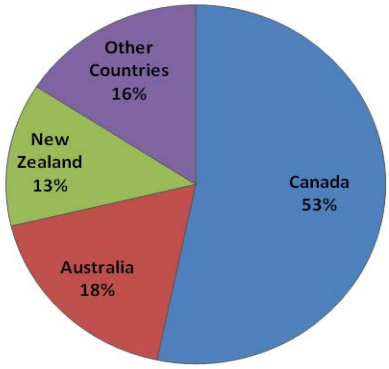


Figure 5. 2010 Imported Meat and Poultry Products by Species and Type (% of total net weight)

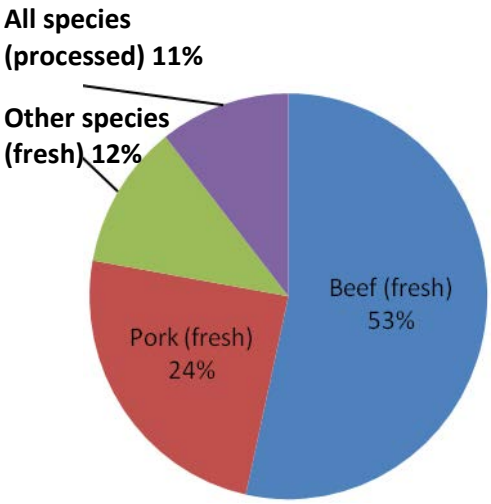
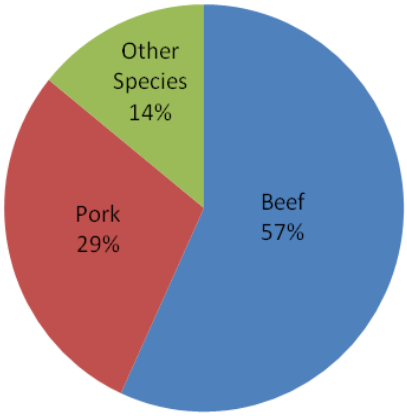


Figure 6. 2010 Imported Meat and Poultry Products by Species (% of total net weight)



DOMESTIC SAMPLING RESULTS: Compound Class Data

Tables 6–13 list summary and detailed results obtained from the FSIS Microbiological and Residue Computer Information System (MARCIS) and FSIS Data Warehouse (DW).

Tables 6a–13a present domestic scheduled sampling results. The tables include the total number of animals tested (i.e., the number of composite samples in the case of poultry), the number of non-violative positives (i.e., compounds detected at a level equal to or below the established tolerance), the number of violations, and the percent of violations for each compound class. Because multiple compounds can be analyzed on the same sample, one sample (i.e., one animal or a composite from one poultry flock) could have more than one violation. A series of bar charts illustrate these data.

Tables 6b–13b summarize violation results by compound class, such as production class, chemical residue, tissue type, and residue detected (ppb or ppm). These tables are contingent on violations being detected.

The additional columns indicate instances when residues were detected, but were not quantitated violative (code: *8888*) or non-violative (code: *9999*).

Table 14 lists the distribution of non-violative positive samples by chemical residue and product class. This corresponds to samples with residue present; however, this concentration is below the tolerance levels.

Antibiotics

An antibiotic is a chemical substance that has the capability in dilute solutions to destroy or inhibit the growth of microorganisms. The antibiotics quantitated by the 7-plate bioassay and associated follow-up methodologies range from ceftiofur, one of the most widely sold animal drugs in the United States, to fluoroquinolone antibiotics, prohibited by the FDA from extra-label use in animals intended for food (see AMDUCA Act). Appendix I contains a complete list of the antibiotics in the 7-plate bioassay.

FSIS laboratories analyzed 4,771 samples for antibiotic residues and detected 5 violations and 93 non-violative positives. The residue violations consisted of 4 neomycin and 1 gentamycin sulfate.

Table 6a. Antibiotics Summary (7-plate bioassay)
2010 Domestic Scheduled Sampling Results

Production Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Sample Percent Violations
Beef Cows	309	1	0	0.00
Boars/Stags	291	2	0	0.00
Bob Veal	208	11	3	1.44
Bulls	292	1	0	0.00
Dairy Cows	306	2	1	0.33
Ducks	57	0	0	0.00
Formula-fed Veal	268	4	0	0.00
Geese	29	1	0	0.00
Goats	77	1	0	0.00
Heavy Calves	81	1	0	0.00
Heifers	276	0	0	0.00
Lambs	248	4	0	0.00
Market Hogs	278	1	0	0.00
Mature Chickens	319	4	0	0.00
Mature Sheep	230	0	0	0.00
Mature Turkeys	239	16	0	0.00
Non-Formula-fed Veal	63	1	0	0.00
Rabbits	47	33	0	0.00
Roaster Pigs	292	4	1	0.34
Sows	300	5	0	0.00
Steers	263	0	0	0.00
Young Chickens	298	1	0	0.00
Total	**4,771**	**93**	**5**	**0.10**

Figure 7. Antibiotics Summary
2010 Domestic Scheduled Sampling Results

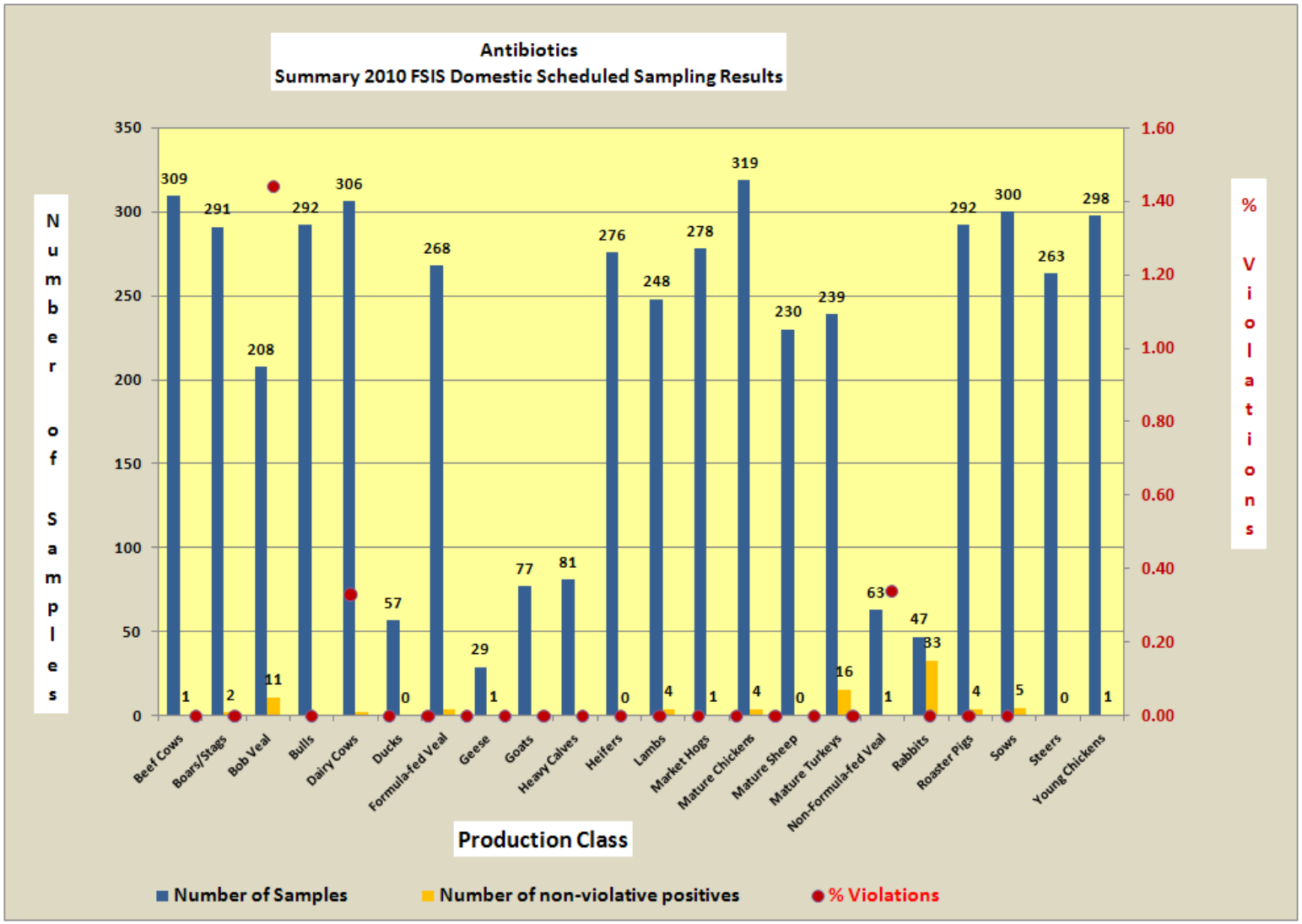


Table 6b. Antibiotics Violations Report
2010 Domestic Scheduled Sampling Results

Production Class	Compound Class	Residue	Tissue	Result (ppm)
Bob Veal	Antibiotics	Neomycin	Kidney	19.43
				9.1
				17.64
Dairy Cows	Antibiotics	Neomycin	Kidney	18.88
Roaster Pigs	Antibiotics	Gentamycin Sulfate	Kidney	8888[7]

Arsenic[8]

Arsenical compounds are used in swine and poultry to promote growth, treat coccidiosis, and prevent bacterial enteritis.

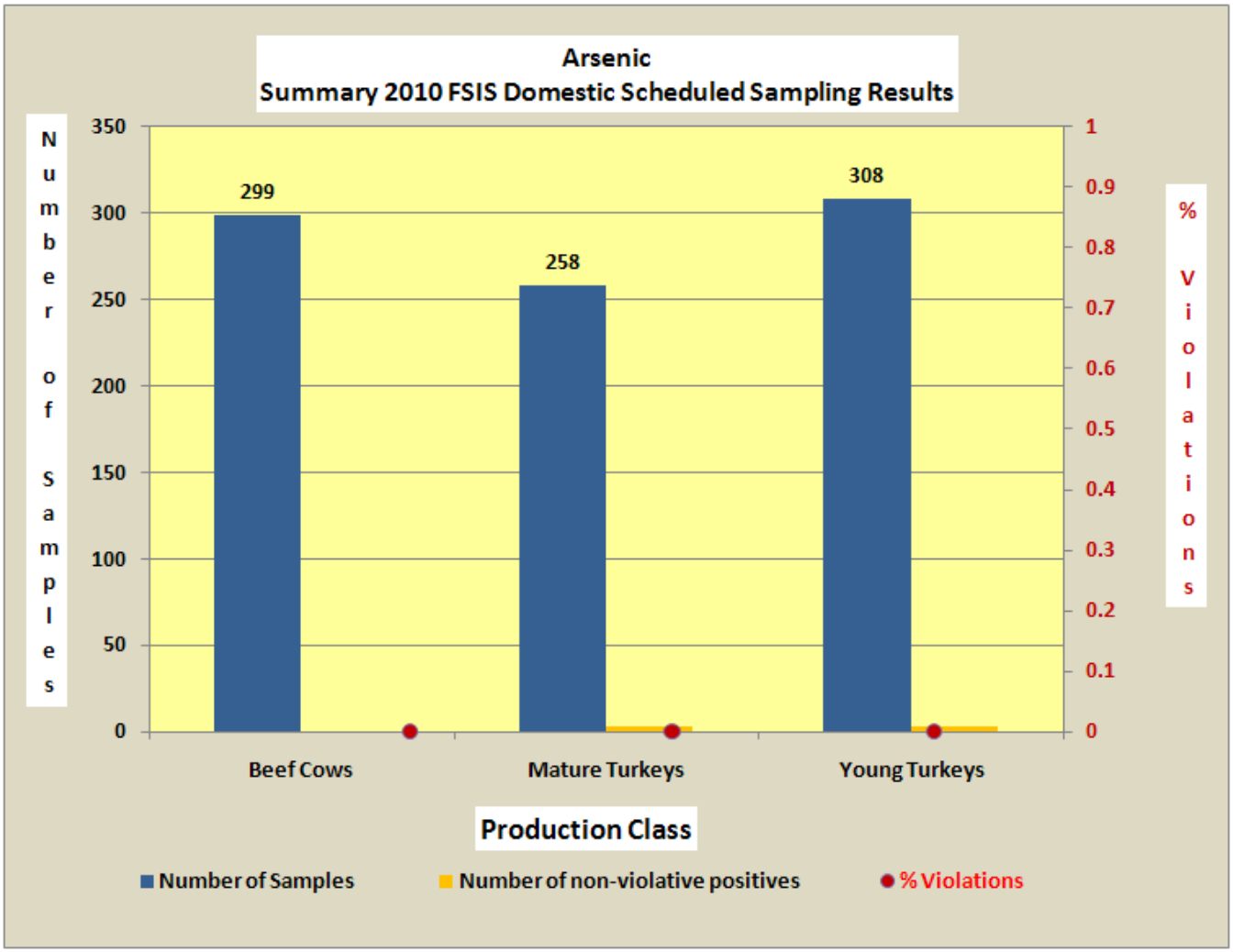
FSIS laboratories analyzed 865 samples from beef cows, mature turkeys, and young turkeys for arsenic; 0 violations and 6 non-violative positives were detected.

Table 7a. Arsenic Summary
2010 Domestic Scheduled Sampling Results

Production Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Beef Cows	299	0	0	0.00
Mature Turkeys	258	3	0	0.00
Young Turkeys	308	3	0	0.00
Total	**865**	**6**	**0**	**0.00**

[7] 8888 means detected, violative, but not quantified.
[8] The method reduces organic arsenic to inorganic arsenic prior to quantification. The reported results include both original organic and inorganic arsenic species.

Figure 8. Arsenic Summary
2010 Domestic Scheduled Sampling Results



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 sheep and cattle.

FSIS laboratories analyzed 1,613 samples for avermectin and milbemycin residues: 5 moxidectin, 1 doramectin, and 1 ivermectin violations were detected.

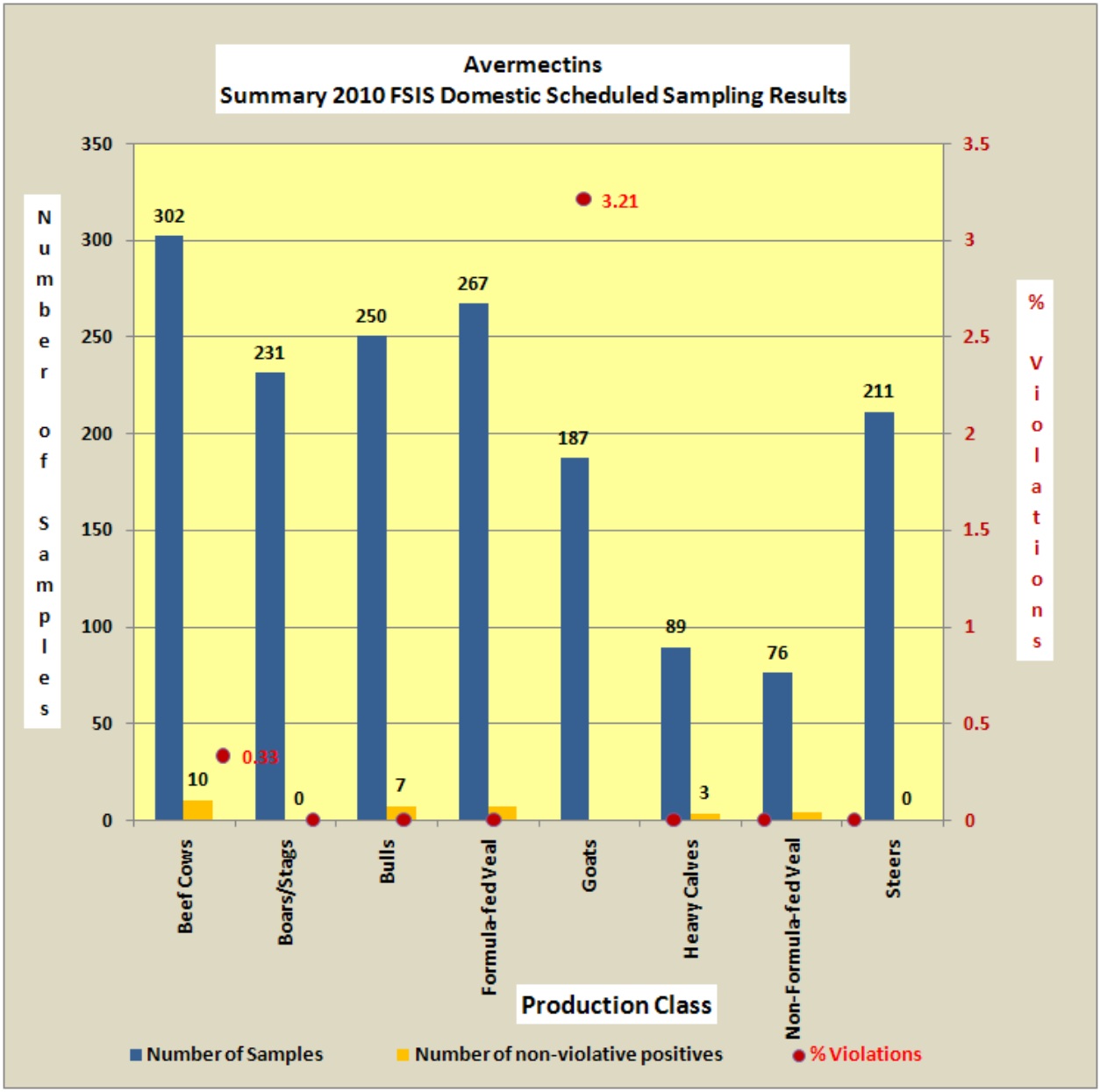
Table 8a. Avermectins and Milbemycins Summary
2010 Domestic Scheduled Sampling Results

Production Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Beef Cows	302	10	1	0.33
Boars/Stags	231	0	0	0.00
Bulls	250	7	0	0.00
Formula-fed Veal	267	7	0	0.00
Goats	187	0	6	3.21
Heavy Calves	89	3	0	0.00
Non-Formula-fed Veal	76	4	0	0.00
Steers	211	0	0	0.00
Total	**1,613**	**31**	**7**	**0.43**

Table 8b. Avermectins Violations Report
2010 Domestic Scheduled Sampling Results

Production Class	Compound Class	Residue	Tissue	Result (ppb)
Goats	Avermectins	Moxidectin	Liver	45.6
				55.5
				38.3
				111.5
				213
Goats	Avermectins	Ivermectin	Liver	117.5
Beef Cows	Avermectins	Doramectin	Liver	158

Figure 9. Avermectins and Milbemycins Summary
2010 Domestic Scheduled Sampling Results



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

Clenbuterol, a growth promotant, is not currently registered for use in livestock in the United States and is listed in the Animal Medicinal Drug Use Clarification Act of 1994 (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. Cimaterol and Salbutamol are *beta*-Agonists not approved for use in United States for food animals.

FSIS laboratories analyzed 840 samples for *beta*-Agonists residues. This study found zero violations for all *beta*-Agonists and one non-violative positive.

Table 9a. *beta*-Agonists Summary
2010 Domestic Scheduled Sampling Results

Production Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Sample Percent Violations
Beef Cows	324	0	0	0.00
Bulls	308	0	0	0.00
Goats	73	0	0	0.00
Market Hogs	1	0	0	0.00
Steers	134	1	0	0.00
Total	**840**	**1**	**0**	**0.00**

Carbadox

Carbadox is approved to prevent or treat enteritis, as well as to improve feed efficiency and weight gain in swine. FSIS laboratories analyzed 462 swine samples for carbadox: 200 in market hogs and 242 in roaster pigs (liver tissue). The results revealed zero violations and zero non-violative positives.

Chloramphenicol

Chloramphenicol is a potent, broad-spectrum antibiotic with toxic effects in humans. As such, this drug is AMDUCA-prohibited for extra label use in animals intended for food. Chloramphenicol can cause bone marrow suppression or aplastic anemia in susceptible individuals. FSIS laboratories analyzed 1,111 samples for chloramphenicol in bob veal, dairy cows, formula-fed veal, sows, steers and young chickens (muscle tissue). The laboratories detected zero violations and zero non-violative positives.

Chlorinated Hydrocarbons and Chlorinated Organophosphates

Chlorinated hydrocarbons, chlorinated organophosphates, organophosphates, and pyrethroids are effective insecticides. Some of these compounds, such as DDT, are no longer marketed because of their extremely long half-life. FSIS employs analytical methodologies to detect these pesticides and environmental contaminants, such as PCBs. Appendix I provide a complete list of the analytes for this multi-residue method.

FSIS laboratories analyzed 1,904 samples for chlorinated hydrocarbons and chlorinated organophosphates residues. Three polybrominated diphenyl ether (PBDE) violations and 1 halowax violation were detected. Both are environmental contaminants without established tolerances. Eleven non-violative positive samples were detected.

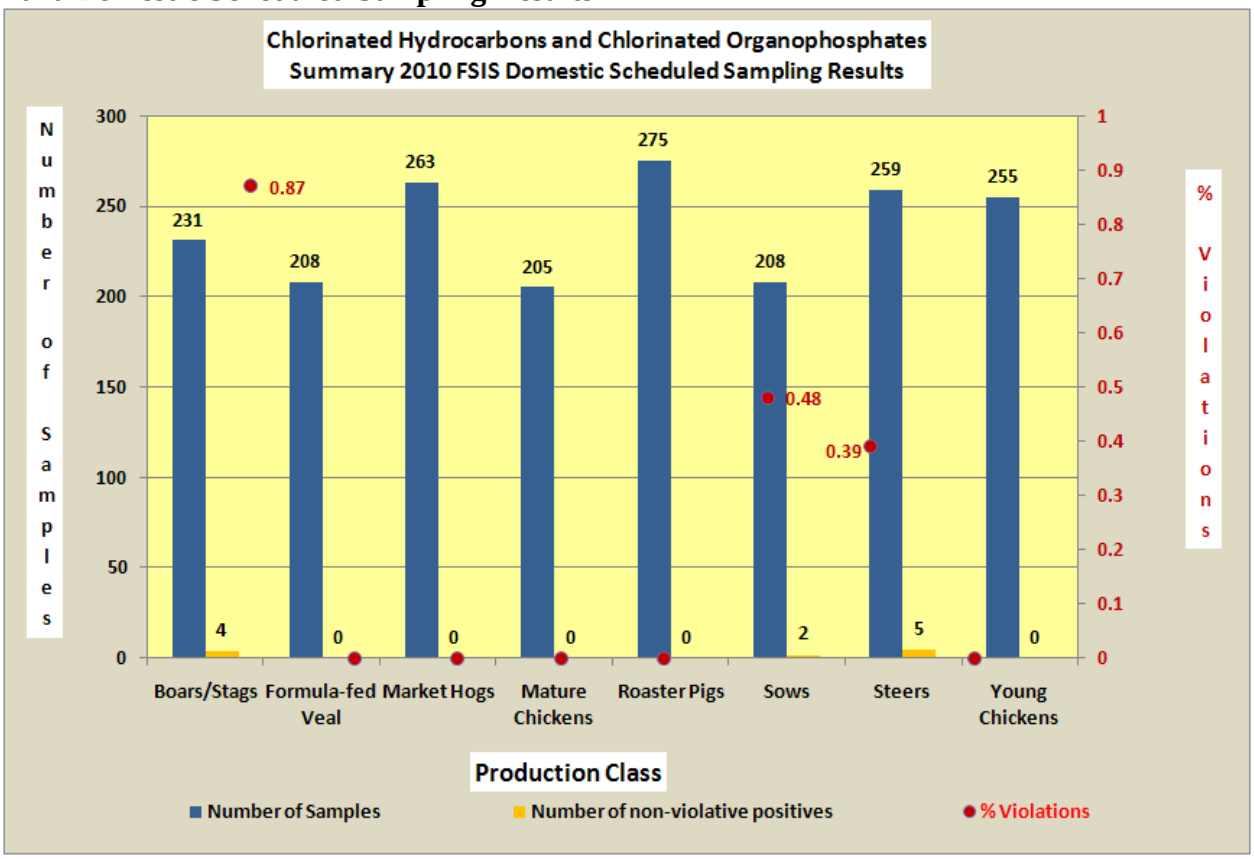
Table 10a. Chlorinated Hydrocarbons and Chlorinated Organophosphates Summary 2010 Domestic Scheduled Sampling Results

Production Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Sample Percent Violations
Boars/Stags	231	4	2	0.87
Formula-fed Veal	208	0	0	0.00
Market Hogs	263	0	0	0.00
Mature Chickens	205	0	0	0.00
Roaster Pigs	275	0	0	0.00
Sows	208	2	1	0.48
Steers	259	5	1	0.39
Young Chickens	255	0	0	0.00
Total	**1,904**	**11**	**4**	**0.21**

Table 10b. Chlorinated Hydrocarbons and Chlorinated Organophosphates Violations Report 2010 Domestic Scheduled Sampling Results

Production Class	Compound Class	Residue	Tissue	Result (ppm)
Steers	CHCs/COPs	PBDE	Fat	8888 (violative)
Boars/Stags	CHCs/COPs	PBDE	Fat	8888 (violative)
Sows	CHCs/COPs	PBDE	Fat	8888 (violative)
Boars/Stags	CHCs/COPs	Halowax	Fat	8888 (violative)

Figure 10. Chlorinated Hydrocarbons and Chlorinated Organophosphates Summary 2010 Domestic Scheduled Sampling Results



Florfenicol

Florfenicol is a broad-spectrum bacteriostatic antibiotic with similar applications as chloramphenicol. However, this antibiotic does not carry the risk of inducing human aplastic anemia that is associated with chloramphenicol. FSIS laboratories analyzed 538 samples for florfenicol residues and detected 1 violation and 1 non-violative positive.

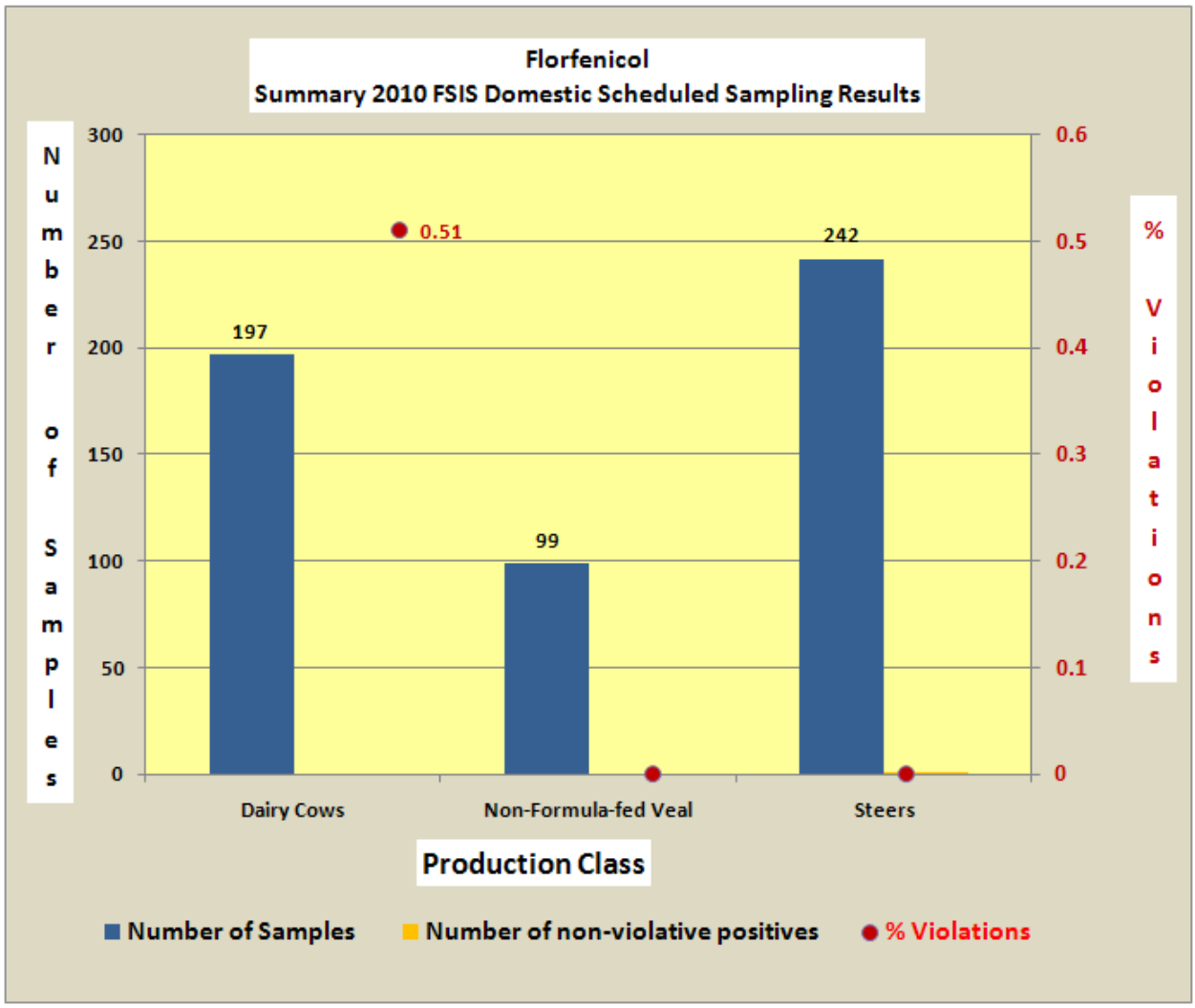
Table 11a. Florfenicol Summary
2010 Domestic Scheduled Sampling Results

Production Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Sample Percent Violations
Dairy Cows	197	0	1	0.51
Non-Formula-fed Veal	99	0	0	0.00
Steers	242	1	0	0.00
Total	**538**	**1**	**1**	**0.19**

Table 11b. Florfenicol Violations Report
2010 Domestic Scheduled Sampling Results

Production Class	Compound Class	Residue	Tissue	Result (ppm)
Dairy Cows	Florfenicol	Florfenicol	Liver	6.09

Figure 11. Florfenicol Summary
2010 Domestic Scheduled Sampling Results



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.

FSIS laboratories analyzed 1,101 samples for flunixin residues and detected 2 violations and 1 non-violative positive.

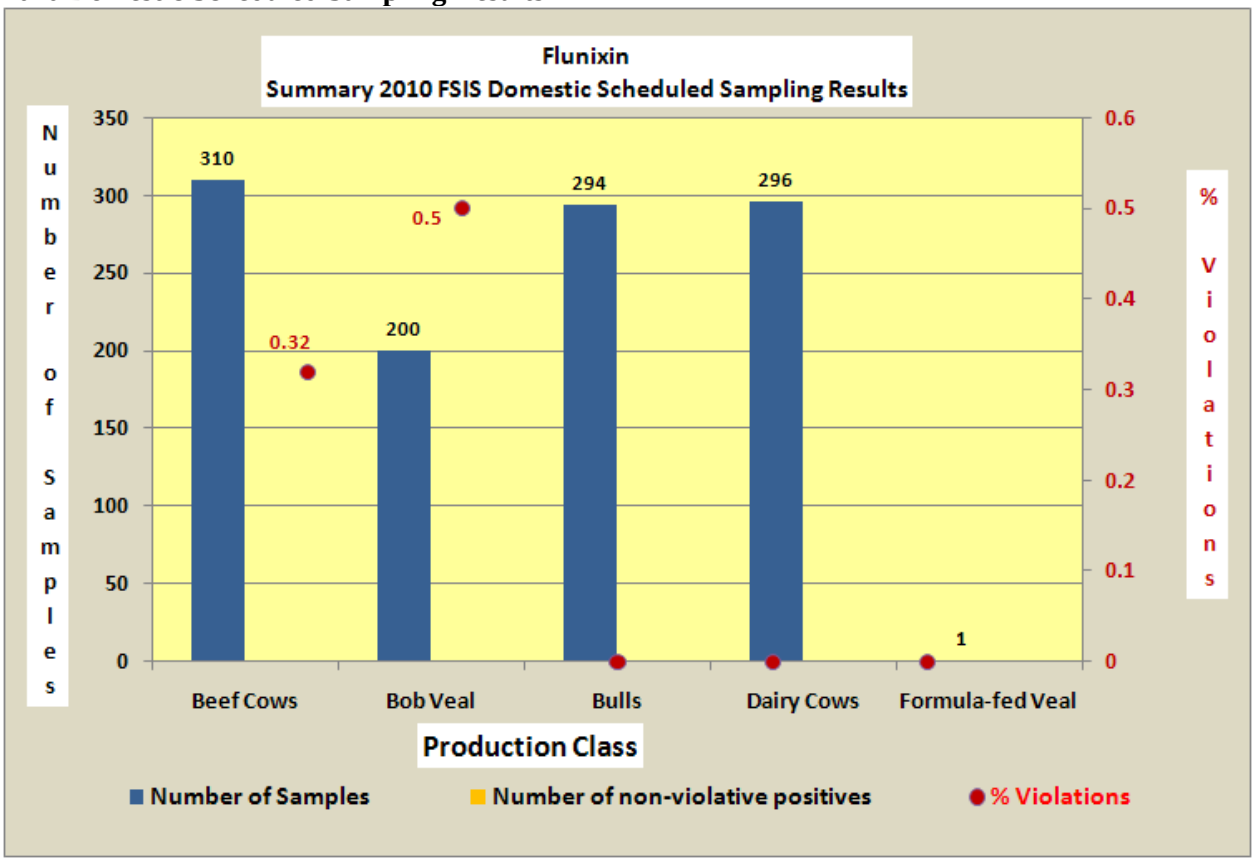
Table 12a. Flunixin Summary
2010 Domestic Scheduled Sampling Results

Production Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Sample Percent Violations
Beef Cows	310	0	1	0.32
Bob Veal	200	0	1	0.50
Bulls	294	0	0	0.00
Dairy Cows	296	1	0	0.00
Formula-fed Veal	1	0	0	0.00
Total	**1,101**	**1**	**2**	**0.18**

Table 12b. Flunixin Violations Report
2010 Domestic Scheduled Sampling Results

Production Class	Compound Class	Residue	Tissue	Result (ppm)
Beef Cows	Flunixin	Flunixin	Liver	0.342
Bob Veal	Flunixin	Flunixin	Liver	0.0855

Figure 12. Flunixin Summary
2010 Domestic Scheduled Sampling Results



Nitrofurans
Furaltadone is a synthetic nitrofuran antibiotic not approved for use in food-producing animals. Furazolidone is AMDUCA-prohibited for extra-label use. FSIS laboratories analyzed 1,144 samples (beef cows, market hogs, and sows) for nitrofuran (furazolidone and furaltadone) residues in liver tissue and detected zero violations.

Nitroimidazoles
Nitroimidazoles, such as dimetridazole and ipronidazole, are AMDUCA-prohibited for extra-label use. FSIS laboratories analyzed 295 samples for nitroimidazole (hydroxyipronidazone and hydoxydimetridazole) residues and detected zero violations and zero non-violative positive residues.

Sulfonamides
Sulfonamides are a group of drugs used to treat infections. Some of these drugs have bacteriostatic action. FSIS laboratories analyzed 2,962 samples for sulfonamides and detected 4 sulfamethazine violations.

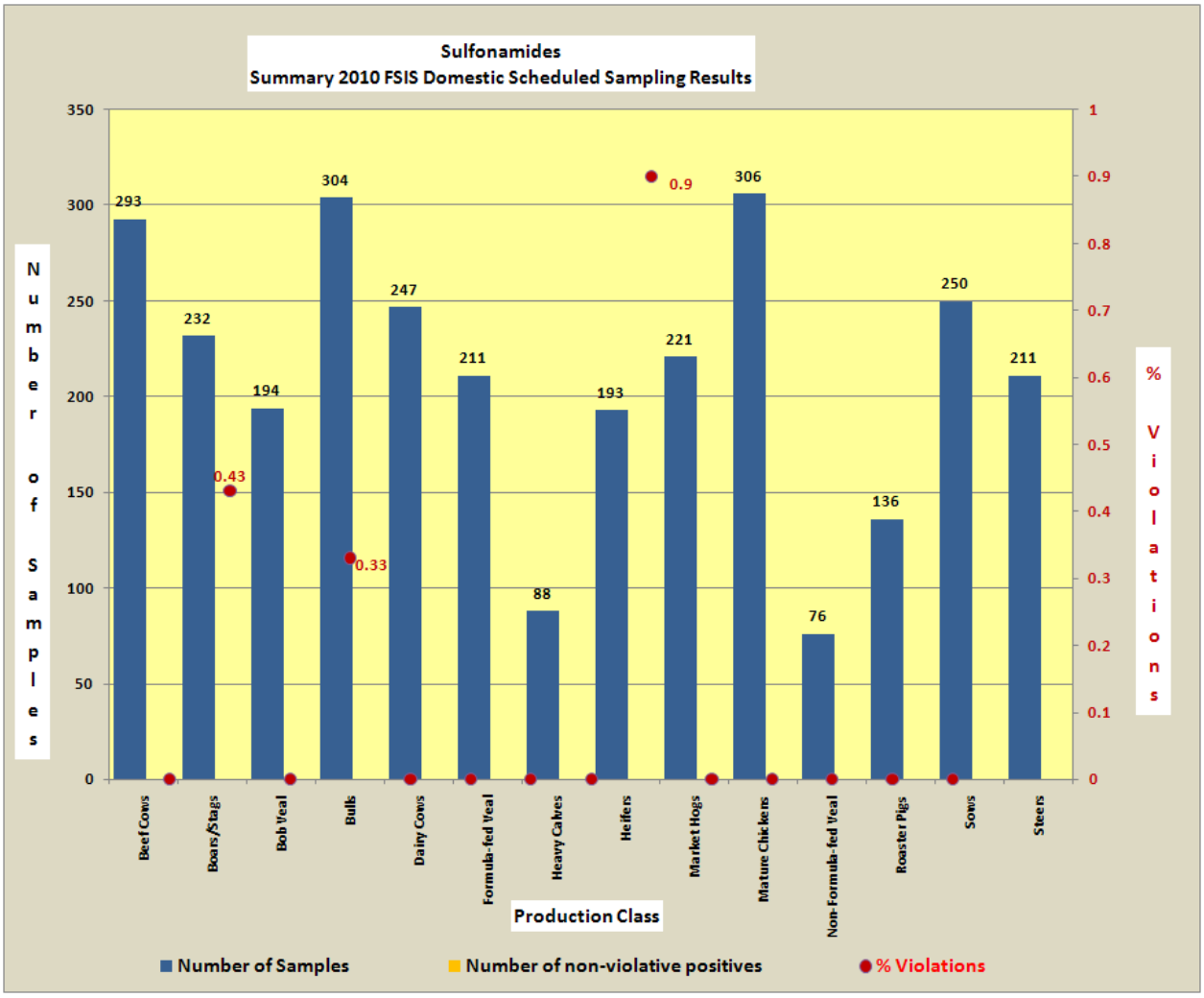
Table 13a. Sulfonamides Summary
2010 Domestic Scheduled Sampling Results

Production Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Sample Percent Violations
Beef Cows	293	0	0	0.00
Boars/Stags	232	0	1	0.43
Bob Veal	194	0	0	0.00
Bulls	304	0	1	0.33
Dairy Cows	247	0	0	0.00
Formula-fed Veal	211	0	0	0.00
Heavy Calves	88	0	0	0.00
Heifers	193	0	0	0.00
Market Hogs	221	0	2	0.90
Mature Chickens	306	0	0	0.00
Non-Formula-fed Veal	76	0	0	0.00
Roaster Pigs	136	0	0	0.00
Sows	250	0	0	0.00
Steers	211	0	0	0.00
Total	**2,962**	**0**	**4**	**0.14**

Table 13b. Sulfonamides Violations Report
2010 Domestic Scheduled Sampling Results

Production Class	Compound Class	Residue	Tissue	Result (ppm)
Bulls	Sulfas	Sulfamethazine	Liver	0.26
Boars/Stags	Sulfas	Sulfamethazine	Liver	0.99
Market Hogs	Sulfas	Sulfamethazine	Liver	0.14
				0.14

Figure 13. Sulfonamides Summary
2010 Domestic Scheduled Sampling Results



Thyreostats

Thyreostats are thyroid-inhibiting compounds that facilitate weight increase.

FSIS laboratories analyzed samples from 403 sows and detected zero violations and zero non-violative positives results in muscle tissue.

Trenbolone

Trenbolone is a xenobiotic anabolic steroid based on the principal male hormone testosterone. This steroid has approved use in cattle, but not for use in pre-ruminant cattle.

FSIS laboratories analyzed 271 samples for trenbolone in formula-fed veal and detected zero violations and zero non-violative positives in liver tissue.

Zeranol

Zeranol is a xenobiotic, estrogenic agent used primarily in veterinary medicine as a growth stimulant. It has approved use in cattle and sheep, but not in pre-ruminant cattle.

FSIS laboratories analyzed 94 samples for zeranol residues in formula-fed veal and detected zero violations and zero non-violative positives in liver tissue.

Table 14. Distribution of Non-Violative Positive Samples by Chemical Residue and Product Class-
2010 Domestic Scheduled Sampling Results

Product Class	Ampicillin	Arsenic	Chlortetracycline	DDT And Metabolites	Dihydro Streptomycin	Doramectin	Florfenicol	Flunixin	Ivermectin	Moxidectin	Neomycin	Oxytetracycline	Ractopamine	Tetracycline Recovered-Nonviolative	Tulathromycin	Unidentified Microbial Inhibitor	Total
Beef Cows	-	-	-	-	-	2	-	-	7	1	1	-	-	-	-	-	**11**
Boars/Stags	-	-	-	4	-	-	-	-	-	-	1	-	-	-	1	-	**6**
Bob Veal	-	-	-	-	3	-	-	-	-	-	7	-	-	1	-	-	**11**
Bulls	-	-	-	-	-	-	-	-	4	3	1	-	-	-	-	-	**8**
Dairy Cows	-	-	-	-	-	-	-	1	-	-	-	1	-	1	-	-	**3**
Formula-fed Veal	1	-	-	-	-	-	-	-	7	-	1	-	-	2	-	-	**11**
Geese	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	**1**
Goats	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	**1**
Heavy Calves	-	-	-	-	-	1	-	-	2	-	-	-	-	-	1	-	**4**
Lambs	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	**4**
Market Hogs	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	**1**
Mature Chickens	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	1	**4**
Mature Turkeys	-	3	2	-	-	-	-	-	-	-	1	-	-	10	-	3	**19**
Non-Formula-fed Veal	-	-	-	-	-	1	-	-	2	1	1	-	-	-	-	-	**5**
Rabbits	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	**33**
Roaster Pigs	-	-	-	-	-	-	-	-	-	-	1	-	-	2	1	-	**4**
Sows	-	-	-	2	-	-	-	-	-	-	1	-	-	-	-	4	**7**
Steers	-	-	-	5	-	-	1	-	-	-	-	-	1	-	-	-	**7**
Young Chickens	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	**1**
Young Turkeys	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**3**
TOTAL	**1**	**6**	**2**	**11**	**3**	**4**	**1**	**1**	**22**	**5**	**16**	**1**	**1**	**25**	**3**	**42**	**144**

DOMESTIC SAMPLING RESULTS: Production Class Data

Tables 15-34 identify information obtained from the FSIS Microbiological and Residue Computer Information System (MARCIS) and FSIS DW. These tables list summary and detailed results by production class.

Tables 15a–34a contain a summary of domestic scheduled sampling results and provide the number of samples analyzed, number of non-violative positives (e.g., compounds detected at a level equal to or below the established tolerance), number of violations, and percent of violations for each production class. Because multiple compounds can be analyzed on the same sample, one sample (e.g., one animal or a composite from one poultry flock) may have more than one violation. The summary data appears as a series of bar charts.

Tables 15b–34b summarizes violation results by production class. These include chemical compound, tissue type, and residue detected results (ppb or ppm).

For some production class categories, Tables 15b–34b may include two columns for some compound class categories. The additional columns indicate instances when residues were detected, but were not quantitated. Code 8888 is used for violative results, and code 9999 for non-violative.

Beef Cows

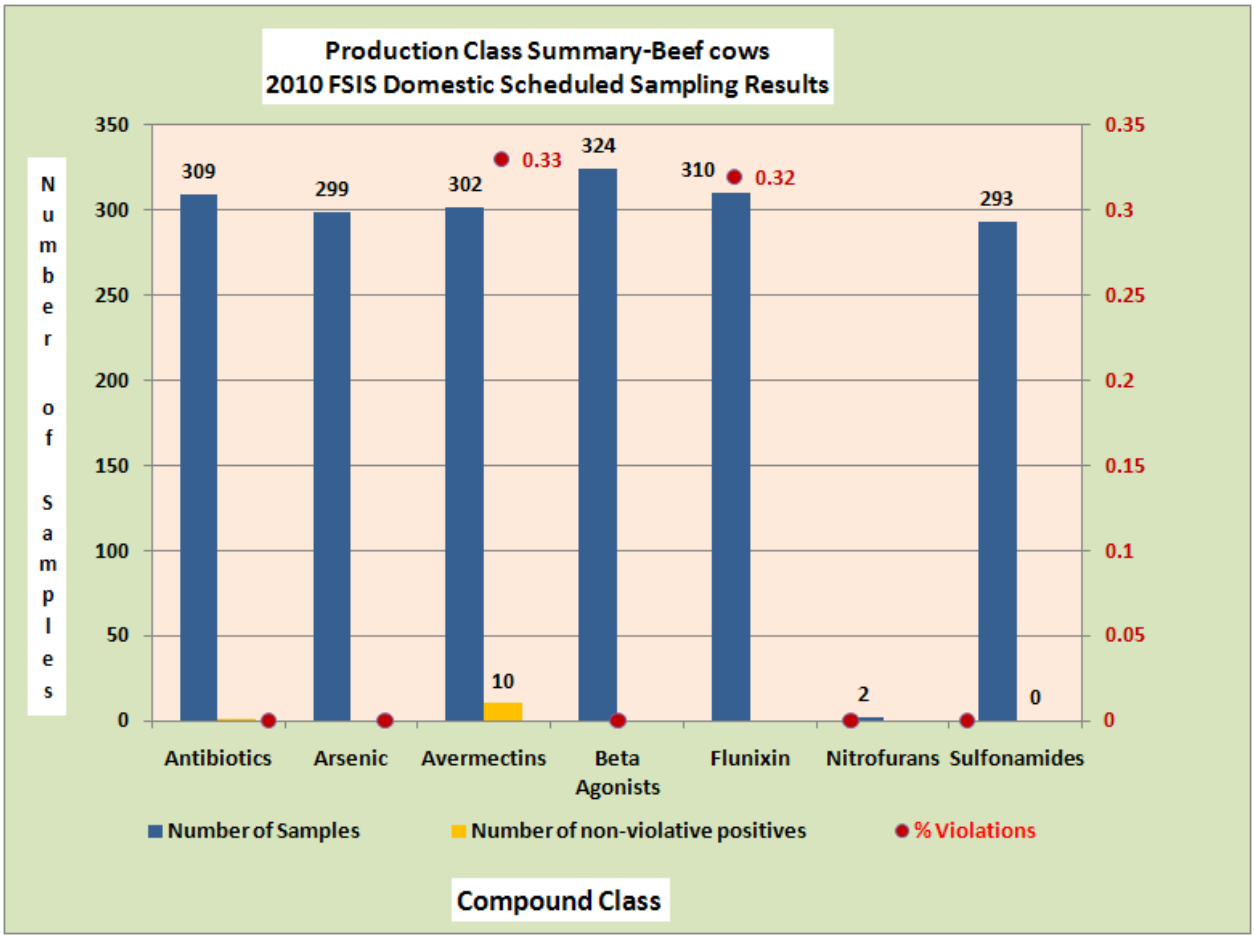
Table 15a. Beef Cows Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	309	1	0	0.00
Arsenic	299	0	0	0.00
Avermectins	302	10	1	0.33
beta-Agonists	324	0	0	0.00
Flunixin	310	0	1	0.32
Nitrofurans	2	0	0	0.00
Sulfonamides	293	0	0	0.00
TOTAL	**1,839**	**11**	**2**	**0.11**

Table 15b. Beef Cows Violations Report
2010 Domestic Scheduled Sampling Results

Compound Class	Residue	Tissue	Result	Unit
Avermectins	Doramectin	Liver	158	ppb
Flunixin	Flunixin	Liver	0.342	ppb

Figure 14. Beef Cows Summary
2010 Domestic Scheduled Sampling Results



Boars/Stags

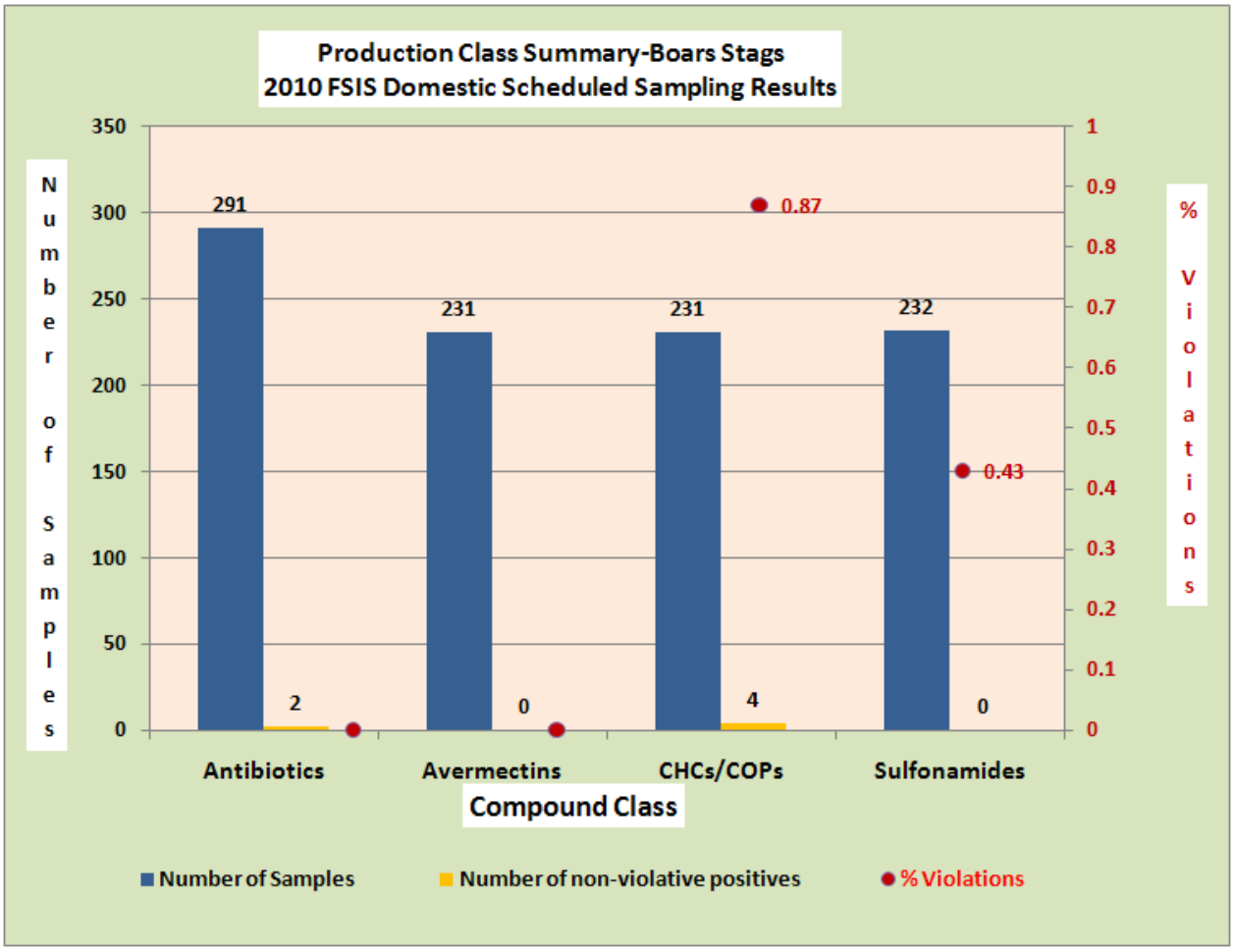
Table 16a. Boars/Stags Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	291	2	0	0.00
Avermectins	231	0	0	0.00
Pesticides	231	4	2	0.87
Sulfonamides	232	0	1	0.43
TOTAL	**985**	**6**	**3**	**0.30**

Table 16b. Boars/Stags Violations Report
2010 Domestic Scheduled Sampling Results

Compound Class	Residue	Tissue	Result	Unit
Pesticides	Polybrominated Diphen	Fat	8888	
Pesticides	Halowax	Fat	8888	
Sulfonamides	Sulfamethazine	Liver	0.99	ppm

Figure 15. Boars/Stags Summary
2010 Domestic Scheduled Sampling Results



Bob Veal

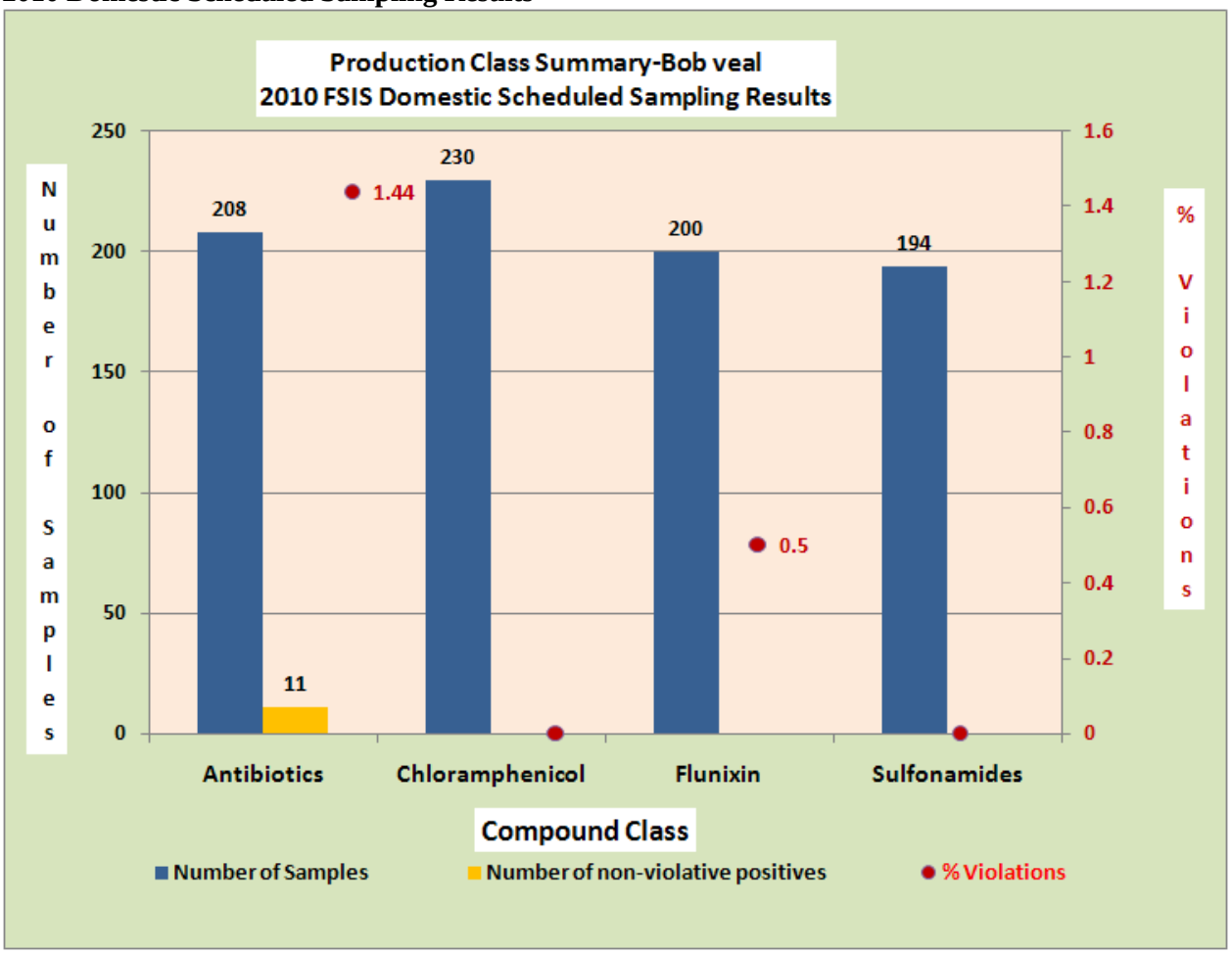
Table 17a. Bob Veal Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	208	11	3	1.44
Chloramphenicol	230	0	0	0.00
Flunixin	200	0	1	0.50
Sulfonamides	194	0	0	0.00
TOTAL	**832**	**11**	**4**	**0.48**

Table 17b. Bob Veal Violations Report
2010 Domestic Scheduled Sampling Results

Compound Class	Residue	Tissue	Result	Unit
Antibiotics	Neomycin	Kidney	19.43	ppm
			17.64	ppm
			9.1	ppm
Flunixin	Flunixin	Liver	0.0855	ppb

Figure 16. Bob Veal Summary
2010 Domestic Scheduled Sampling Results



Bulls

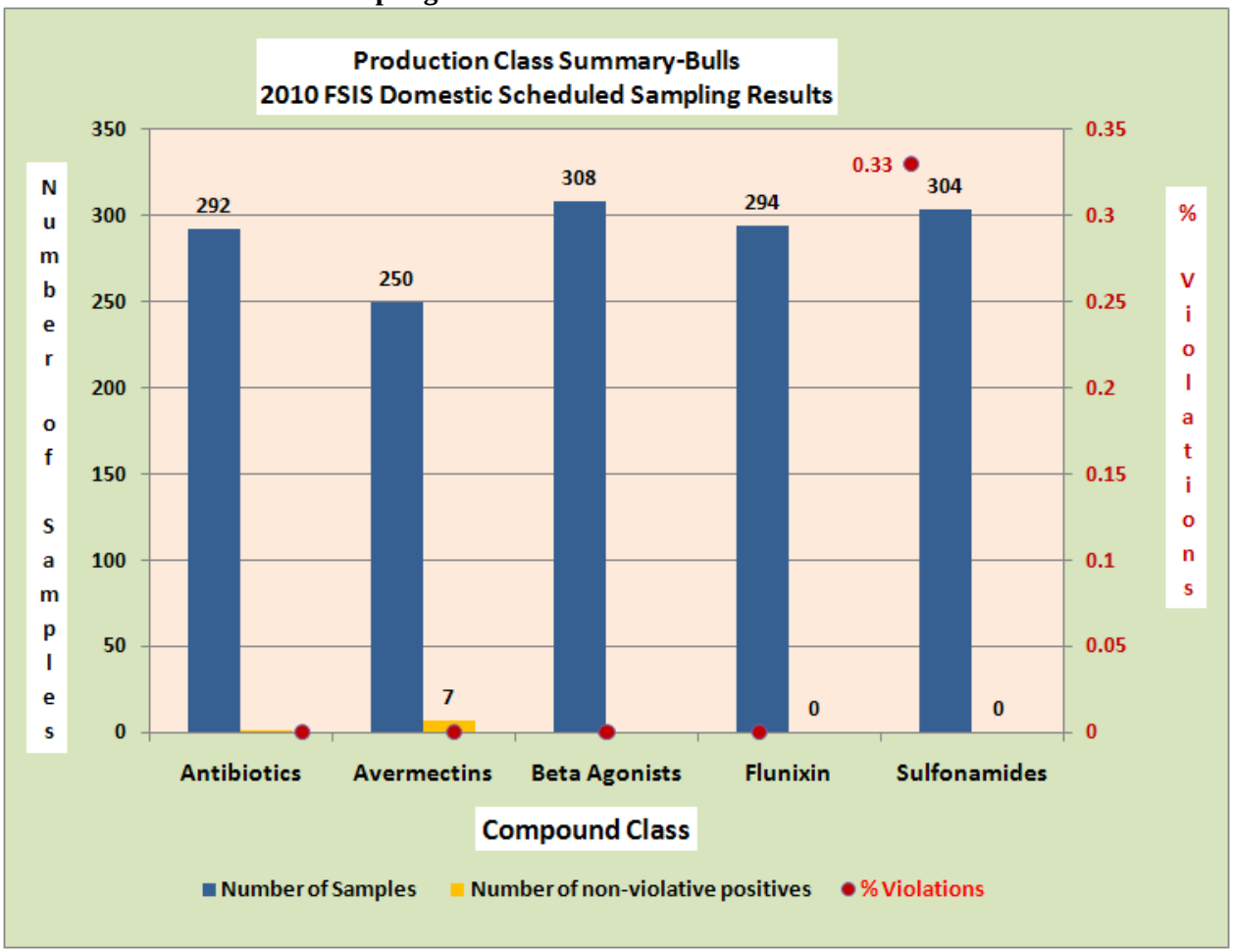
Table 18a. Bulls Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	292	1	0	0.00
Avermectins	250	7	0	0.00
beta-Agonists	308	0	0	0.00
Flunixin	294	0	0	0.00
Sulfonamides	304	0	1	0.33
TOTAL	**1,448**	**8**	**1**	**0.07**

Table 18b. Bulls Violations Report
2010 Domestic Scheduled Sampling Results

Compound Class	Residue	Tissue	Result	Unit
Sulfonamides	Sulfamethazine	Liver	0.26	ppm

Figure 17. Bulls Summary
2010 Domestic Scheduled Sampling Results



Dairy Cows

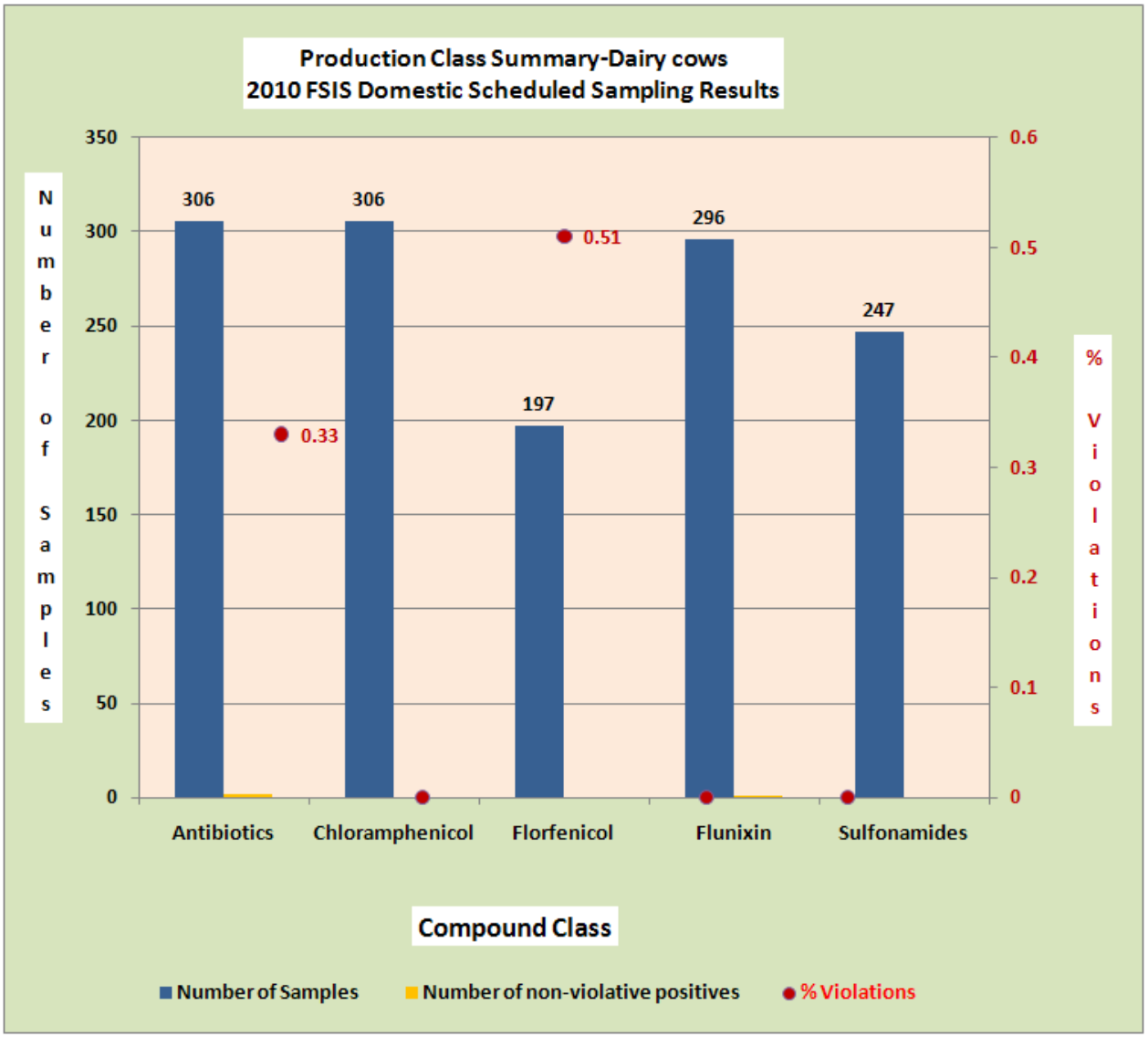
Table 19a. Dairy Cows Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	306	2	1	0.33
Chloramphenicol	306	0	0	0.00
Florfenicol	197	0	1	0.51
Flunixin	296	1	0	0.00
Sulfonamides	247	0	0	0.00
TOTAL	**1,352**	**3**	**2**	**0.15**

Table 19b. Dairy Cows Violations Report
2010 Domestic Scheduled Sampling Results

Compound Class	Residue	Tissue	Result	Unit
Antibiotics	Neomycin	Kidney	18.88	ppm
Florfenicol	Florfenicol	Liver	6.09	ppm

Figure 18. Dairy Cows Summary
2010 Domestic Scheduled Sampling Results



Ducks
2010 Domestic Scheduled Sampling Results

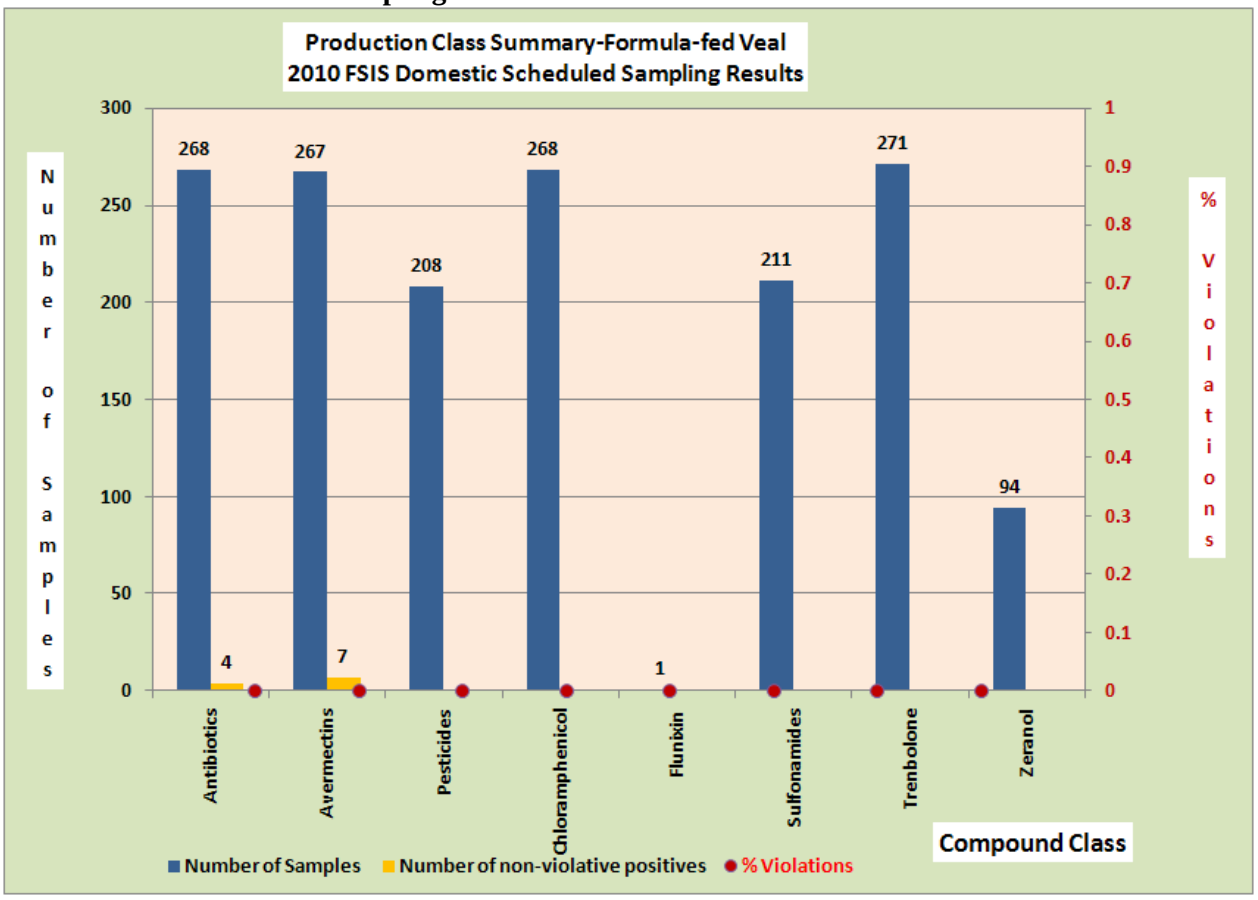
Ducks were tested for antibiotics in kidney tissue. In 57 samples, there were no violations and no non-violative positives.

Formula-fed Veal

Table 20a. Formula-fed Veal Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	268	4	0	0.00
Avermectins	267	7	0	0.00
Pesticides	208	0	0	0.00
Chloramphenicol	268	0	0	0.00
Flunixin	1	0	0	0.00
Sulfonamides	211	0	0	0.00
Trenbolone	271	0	0	0.00
Zeranol	94	0	0	0.00
TOTAL	**1,588**	**11**	**0**	**0.00**

Figure 19. Formula-fed Veal Summary
2010 Domestic Scheduled Sampling Results



Geese

Table 21a. Geese Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	29	1	0	0.00
Total	**29**	**1**	**0**	**0.0**

Goats

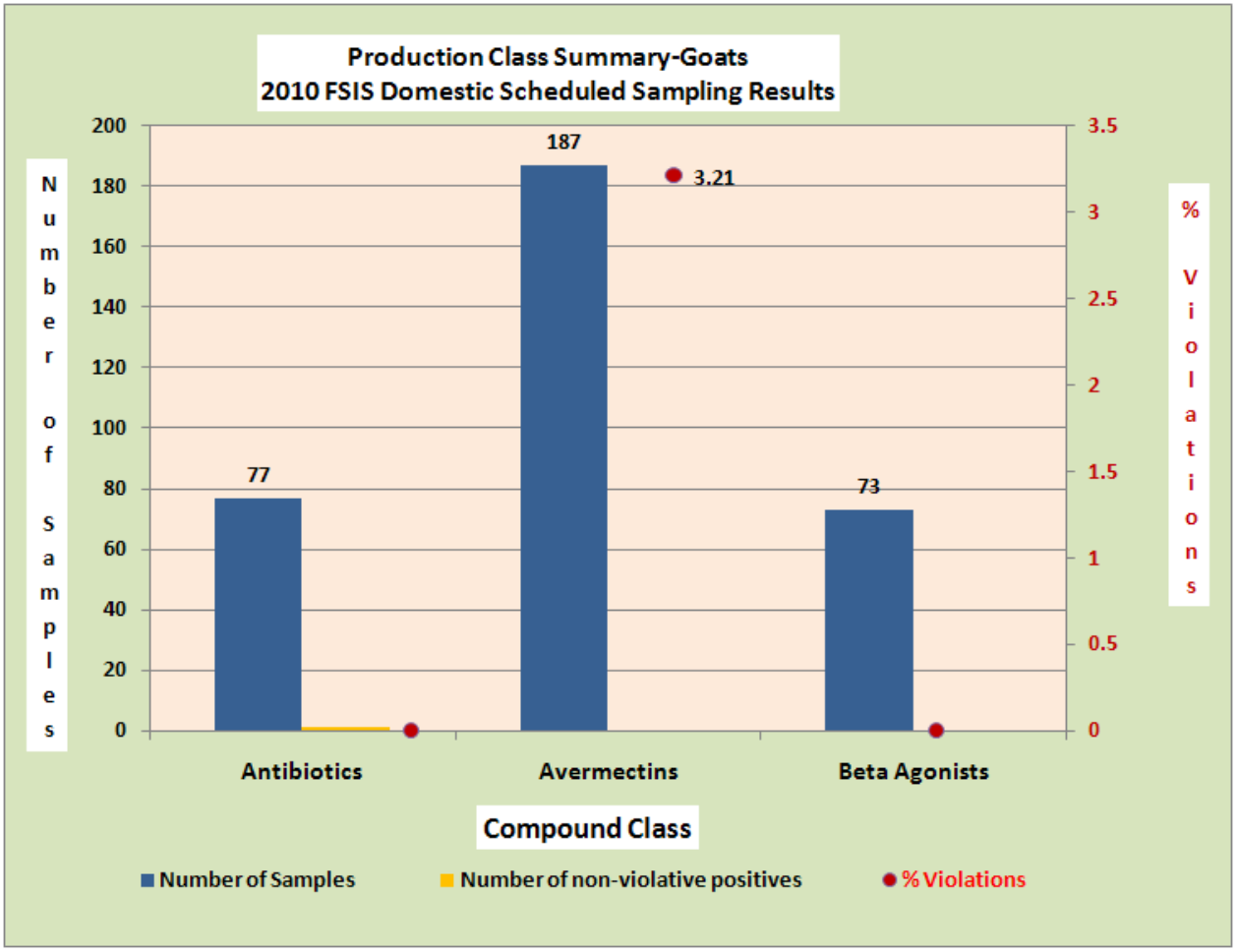
Table 22a. Goats Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	77	1	0	0.00
Avermectins	187	0	6	3.21
beta-Agonists	73	0	0	0.00
TOTAL	**337**	**1**	**6**	**1.78**

Table 22b. Goats Violations Report
2010 Domestic Scheduled Sampling Results

Compound Class	Residue	Tissue	Result	Unit
Avermectins	Moxidectin	Liver	45.6	ppb
			55.5	ppb
			213	ppb
			117.5	ppb
			38.3	ppb
			111.5	ppb

Figure 20. Goats Summary
2010 Domestic Scheduled Sampling Results

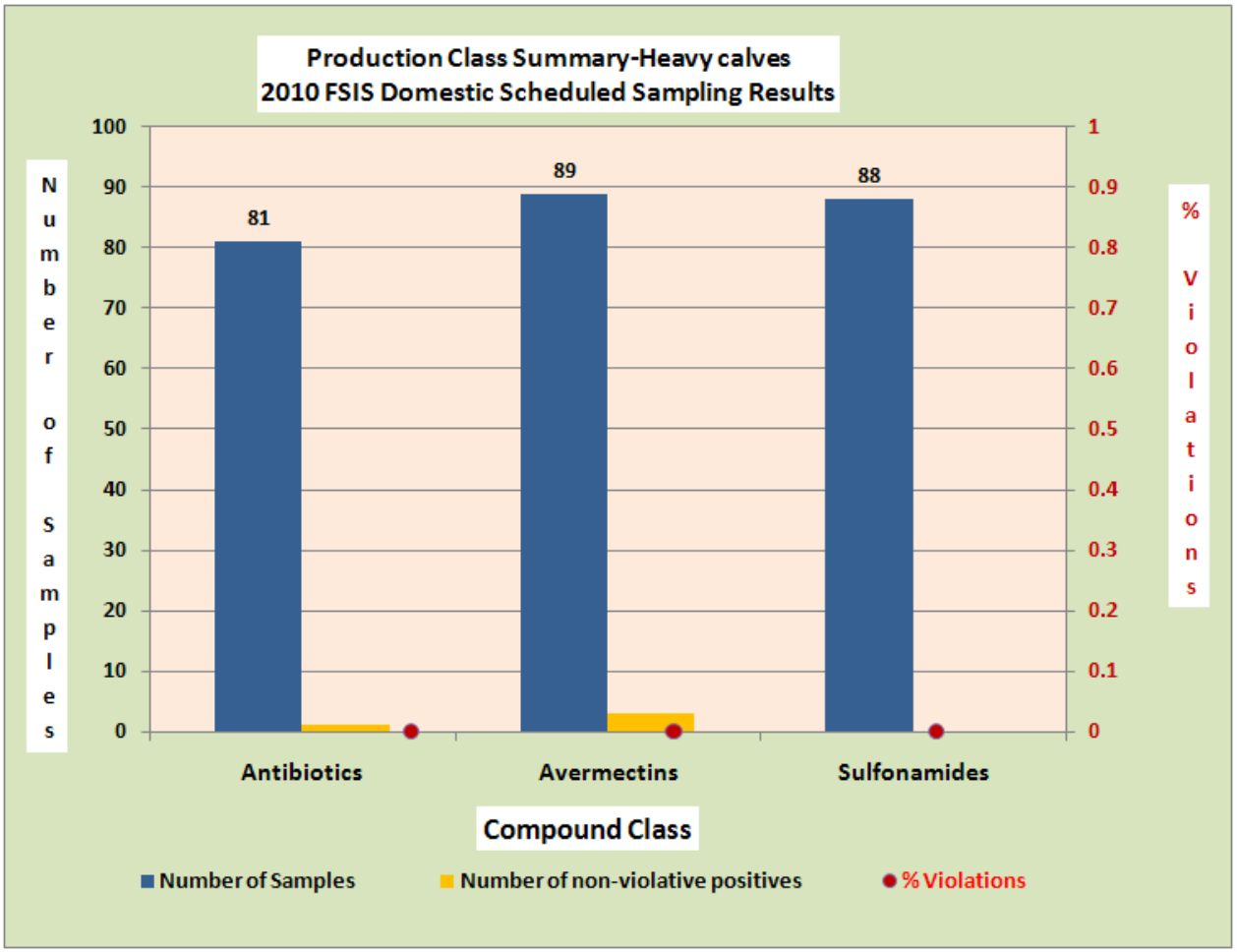


Heavy Calves

Table 23a. Heavy Calves Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	81	1	0	0.00
Avermectins	89	3	0	0.00
Sulfonamides	88	0	0	0.00
TOTAL	**258**	**4**	**0**	**0.00**

Figure 21. Heavy Calves Summary
2010 Domestic Scheduled Sampling Results



Heifers
2010 Domestic Scheduled Sampling Results

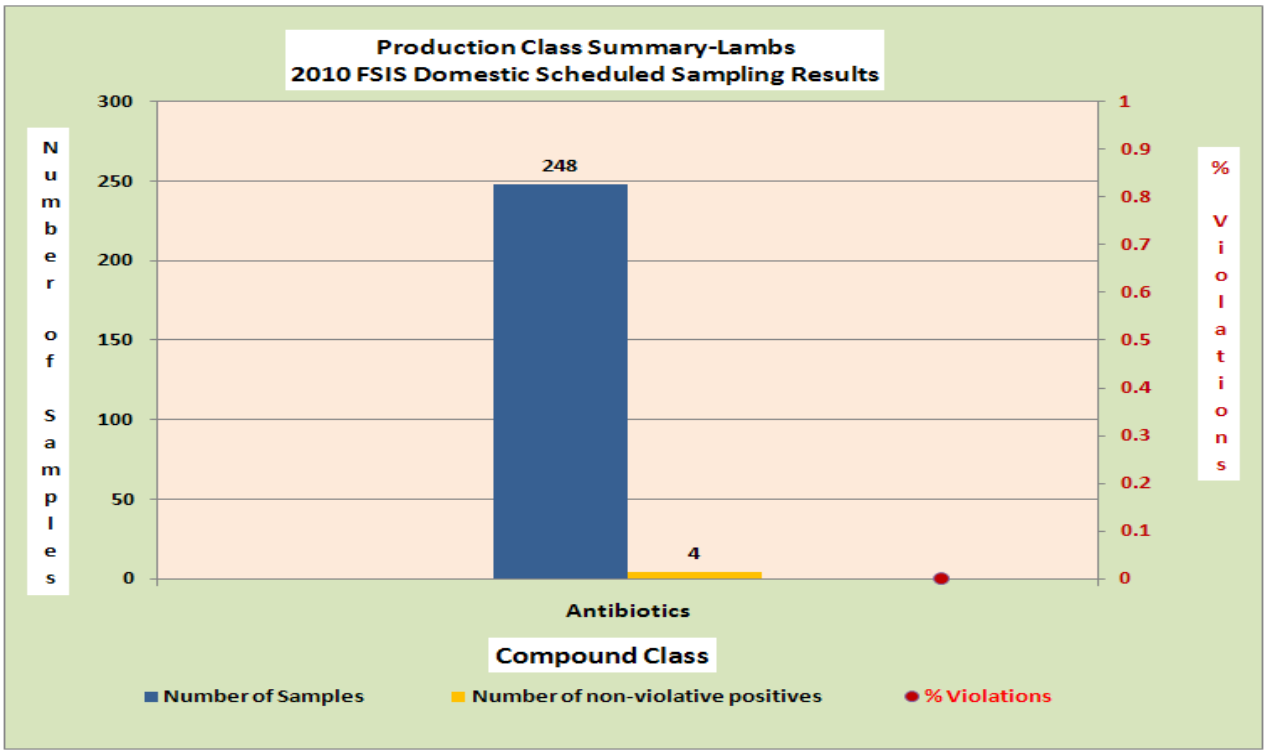
Heifers were tested for antibiotics (276 samples) and sulfonamides (193 samples). There were no violations or non-violative positives.

Lambs

Table 24a. Lambs Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	248	4	0	0.00
TOTAL	**248**	**4**	**0**	**0.00**

Figure 22. Lamb Summary
2010 Domestic Scheduled Sampling Results



Market Hogs

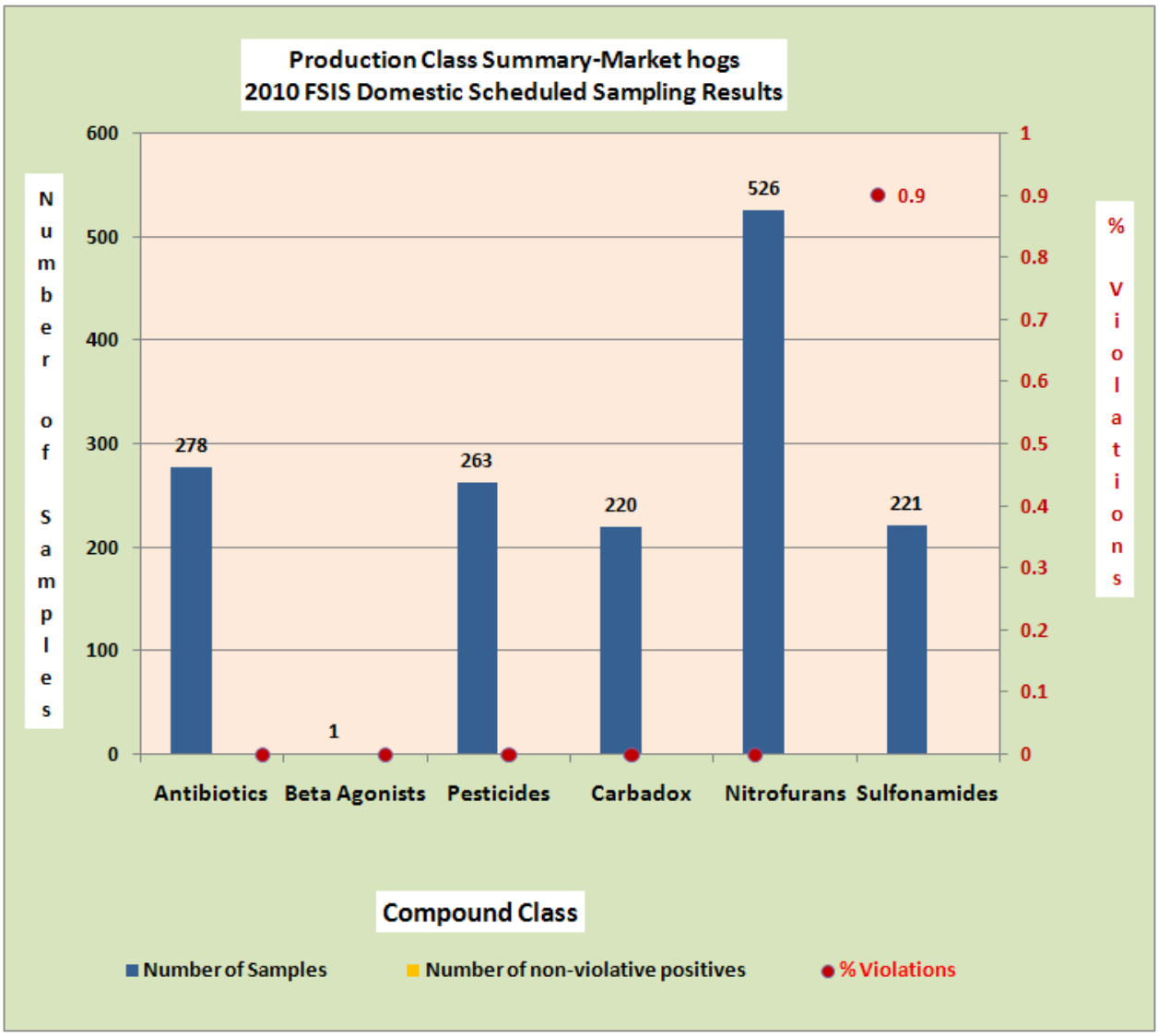
Table 25a. Market Hogs Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	278	1	0	0.00
beta-Agonists	1	0	0	0.00
Pesticides	263	0	0	0.00
Carbadox	220	0	0	0.00
Nitrofurans	526	0	0	0.00
Sulfonamides	221	0	2	0.90
TOTAL	**1,509**	**1**	**2**	**0.13**

Table 25b. Market Hogs Violation Report
2010 Domestic Scheduled Sampling Results

Compound Class	Residue	Tissue	Result	Unit
Sulfonamides	Sulfamethazine	Liver	0.14	ppb
			0.14	ppb

Figure 23. Market Hogs Summary
2010 Domestic Scheduled Sampling Results

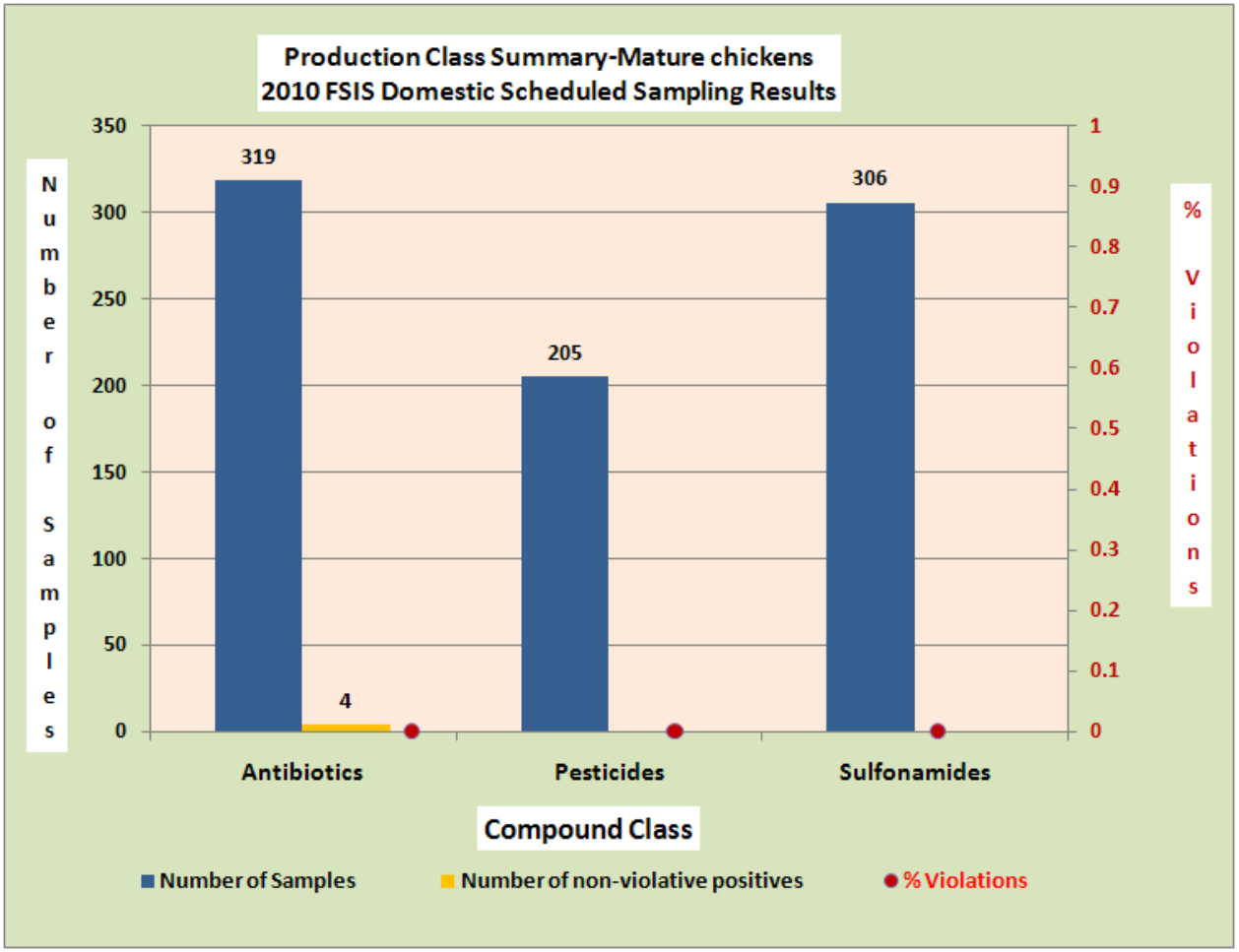


Mature Chickens

Table 26a. Mature Chickens Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	319	4	0	0.00
Pesticides	205	0	0	0.00
Sulfonamides	306	0	0	0.00
TOTAL	**830**	**4**	**0**	**0.00**

Figure 24. Mature Chicken Summary
2010 Domestic Scheduled Sampling Results



Mature Sheep
2010 Domestic Scheduled Sampling Results

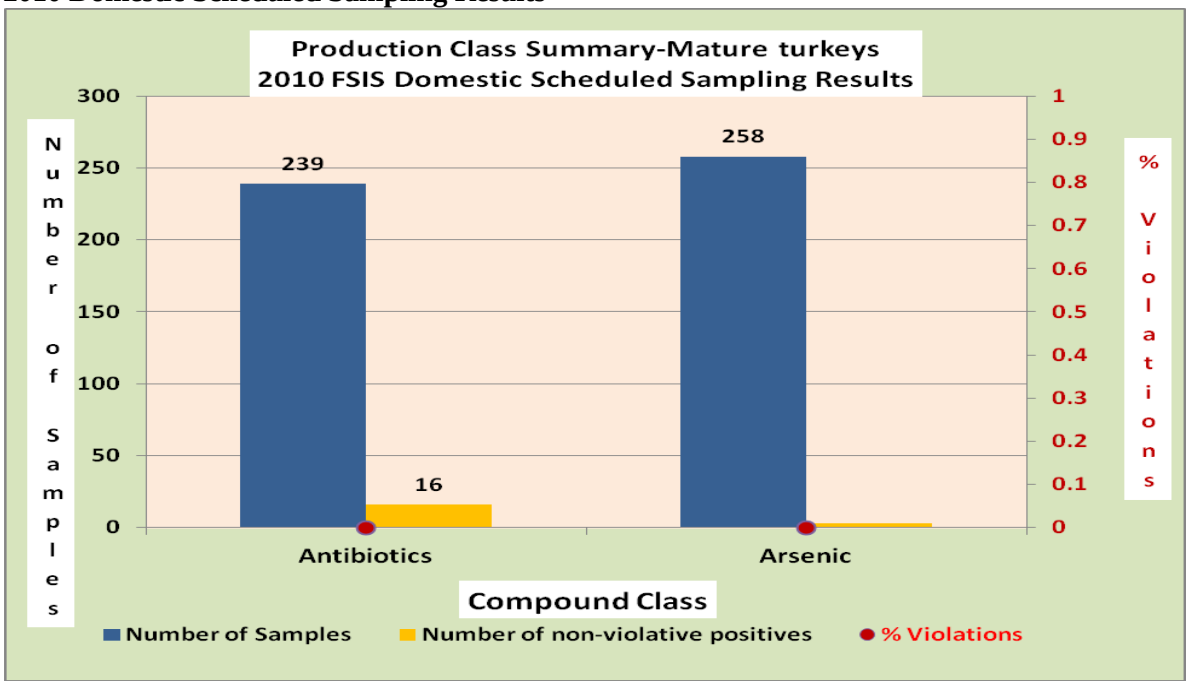
Mature sheep were tested for antibiotics. In 230 samples of kidney tissue, there were no violations and no non-violative positives.

Mature Turkeys

Table 27a. Mature Turkeys Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	239	16	0	0.00
Arsenic	258	3	0	0.00
TOTAL	**497**	**19**	**0**	**0.00**

Figure 25. Mature Turkeys Summary
2010 Domestic Scheduled Sampling Results

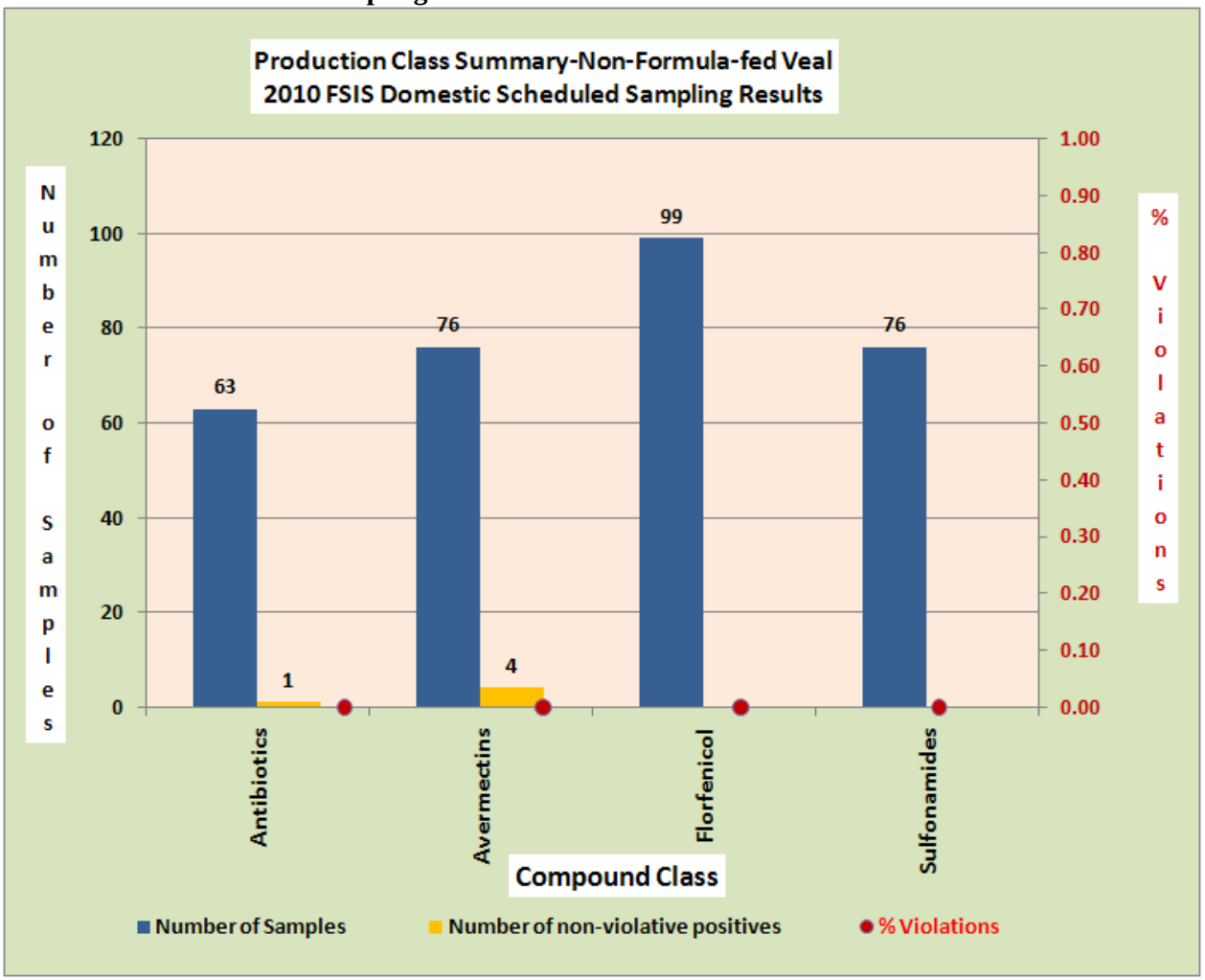


Non-formula Fed Veal

Table 28a. Non-formula fed Veal Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	63	1	0	0.00
Avermectins	76	4	0	0.00
Florfenicol	99	0	0	0.00
Sulfonamides	76	0	0	0.00
TOTAL	**314**	**5**	**0**	**0.00**

Figure 26. Non-formula Fed Veal Summary
2010 Domestic Scheduled Sampling Results



Rabbits

Table 29a. Rabbits Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	47	33	0	0.00
TOTAL	**47**	**33**	**0**	**0.00**

Roaster Pigs

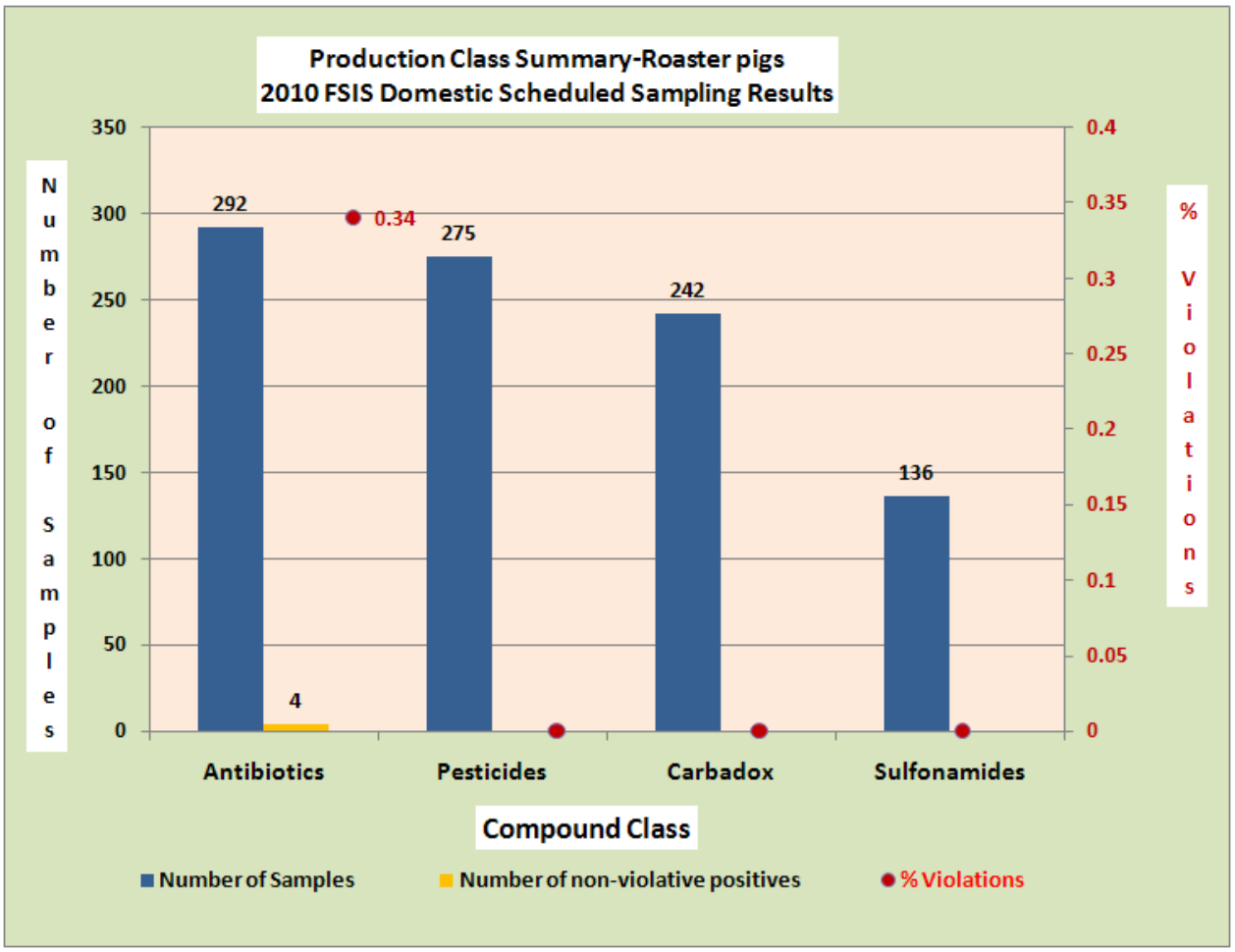
Table 30a. Roaster Pigs Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	292	4	1	0.34
Carbadox	242	0	0	0.00
Pesticides	275	0	0	0.00
Sulfonamides	136	0	0	0.00
TOTAL	**945**	**4**	**1**	**0.11**

Table 30b. Roaster Pigs Violations Report
2010 Domestic Scheduled Sampling Results

Compound Class	Residue	Tissue	Result	Unit
Antibiotics	Gentamycin Sulfate	Kidney	8888	ppm

Figure 27. Roaster Pigs Summary
2010 Domestic Scheduled Sampling Results



Sows

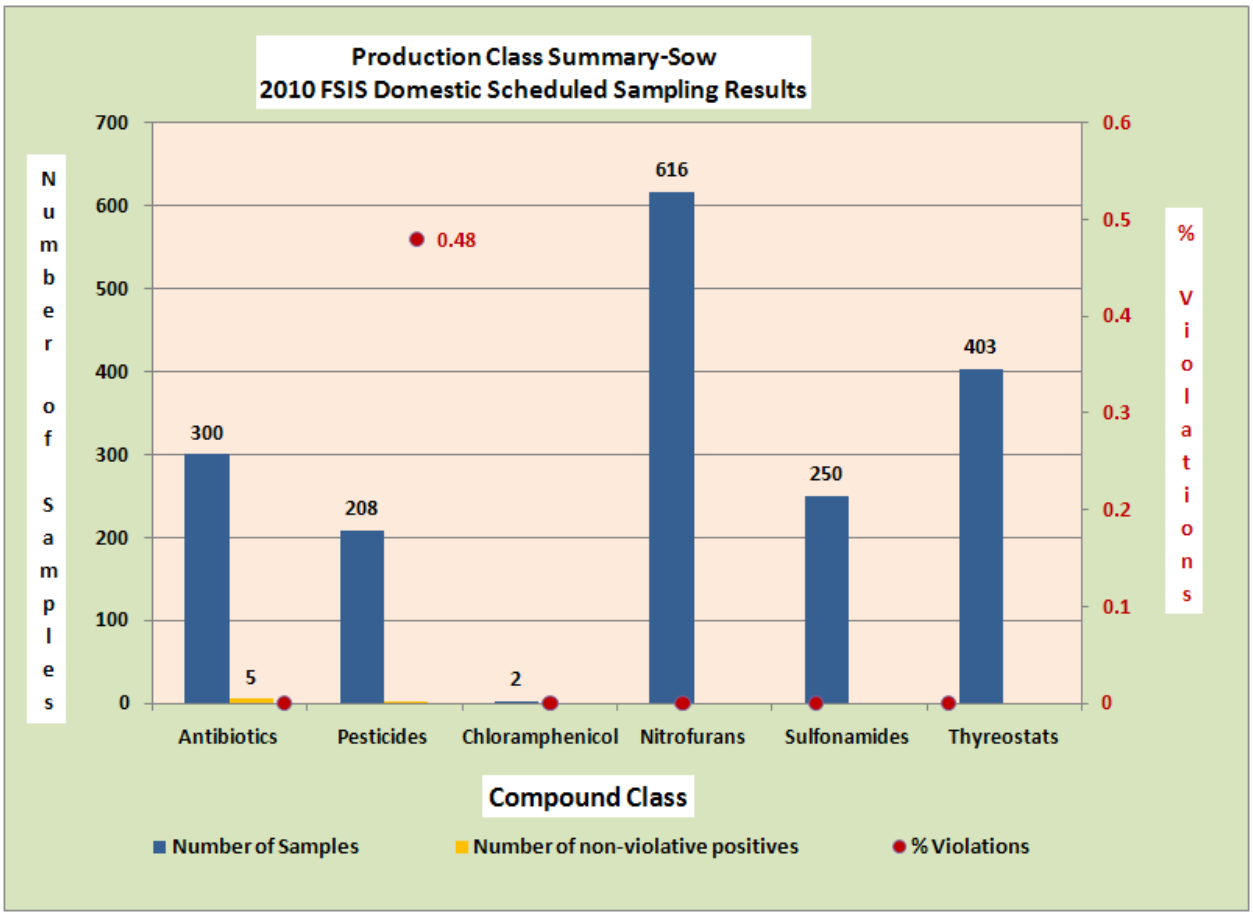
Table 31a. Sows Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	300	5	0	0.00
Pesticides	208	2	1	0.48
Chloramphenicol	2	0	0	0.00
Nitrofurans	616	0	0	0.00
Sulfonamides	250	0	0	0.00
Thyreostats	403	0	0	0.00
TOTAL	**1,779**	**7**	**1**	**0.06**

Table 31b. Sows Violations Report
2010 Domestic Scheduled Sampling Results

Compound Class	Residue	Tissue	Result	Unit
Pesticides	Polybrominated Diphenyl Ether (PBDE)	Fat	8888	ppm

Figure 28. Sows Summary
2010 Domestic Scheduled Sampling Results



Steers

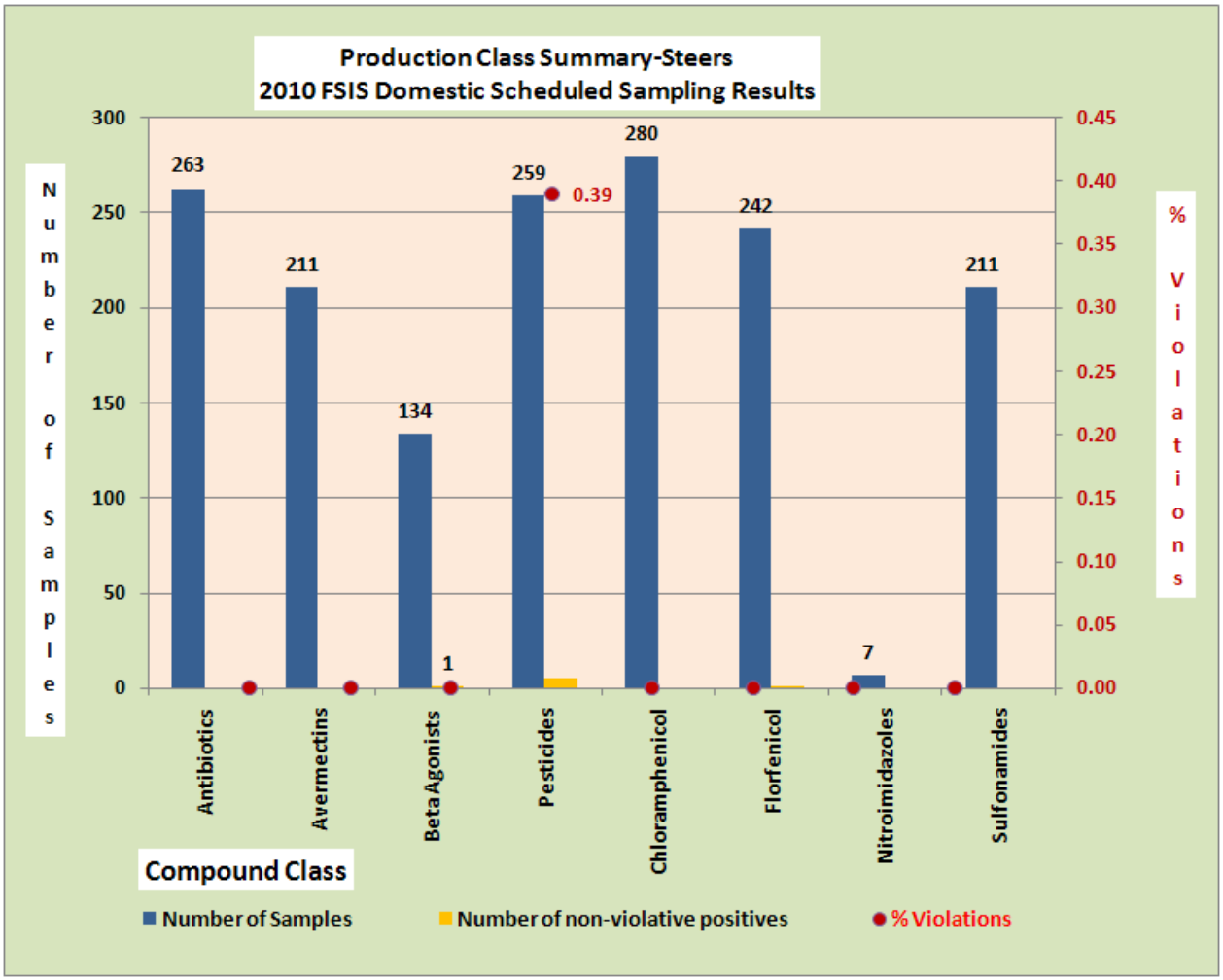
Table 32a. Steers Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	263	0	0	0.00
Avermectins	211	0	0	0.00
beta-Agonists	134	1	0	0.00
Pesticides	259	5	1	0.39
Chloramphenicol	280	0	0	0.00
Florfenicol	242	1	0	0.00
Nitroimidazoles	7	0	0	0.00
Sulfonamides	211	0	0	0.00
TOTAL	**1,607**	**7**	**1**	**0.06**

Table 32b. Steers Violation Report
2010 Domestic Scheduled Sampling Results

Compound Class	Residue	Tissue	Result	Unit
Pesticides	Polybrominated Diphenyl Ether (PBDE)	Kidney	8888	ppm

Figure 29. Steers Summary
2010 Domestic Scheduled Sampling Results

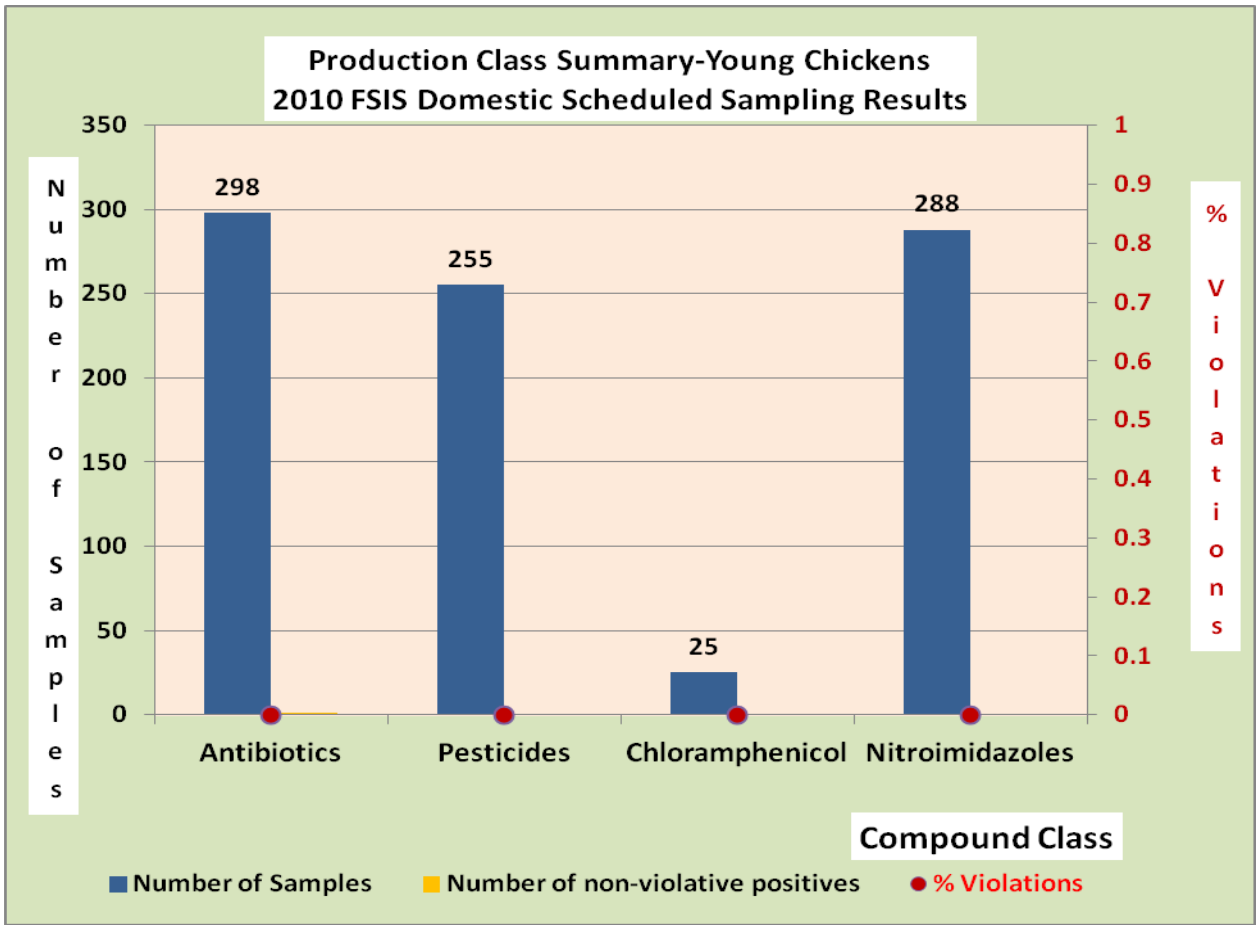


Young Chickens

Table 33a. Young Chickens Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Antibiotics	298	1	0	0.00
Pesticides	255	0	0	0.00
Chloramphenicol	25	0	0	0.00
Nitroimidazoles	288	0	0	0.00
TOTAL	**866**	**1**	**0**	**0.00**

Figure 30. Young Chickens Summary
2010 Domestic Scheduled Sampling Results



Young Turkeys

Table 34a. Young Turkeys Summary
2010 Domestic Scheduled Sampling Results

Compound Class	Number of Samples	Number of Non-violative Positives	Number of Violations	Percent Violations
Arsenic	308	3	0	0.00
TOTAL	**308**	**3**	**0**	**0.00**

Egg Products
2010 Domestic Scheduled Sampling Results

Egg products were tested for sulfonamides. In 239 samples, there were no violations and no non-violative positives.

Scheduled Sampling – Targeted Assessments

Environmental Contaminants (Cadmium and Lead)

In 1998 FDA recommended that FSIS include cadmium and lead in the NRP on a periodic basis and to analyze the metals in liver and kidney. In 2010, FSIS conducted a survey of the prevalence of cadmium and lead in dairy cows. Muscle and kidney samples with cadmium levels below the Minimum Proficiency Level [9] (i.e., 10 ppb for cadmium and 25 ppb for lead) are labeled non-detect (ND) in Tables 35 and 36. Table 35 presents the number of positives and ND samples by metal and tissue analyzed.

Table 35. Number of Positive and Non-detect Dairy Cows Samples Analyzed for Cadmium and Lead, 2010 Targeted Assessments Results

Environmental Contaminants		Samples		
		Non-detect	Positive[10]	Total
Metal				
Cadmium	Kidney	0	148	148
	Muscle	148	0	148
	Total for Cadmium	**148**	**148**	**296**
Lead	Kidney	119	29	148
	Muscle	146	2	148
	Total for Lead	**265**	**31**	**296**

[9] Minimum Proficiency Level: The minimum concentration of a residue at which an analytical result will be used to assess a laboratory's quantification capability

[10] Positive samples have detectable Minimum Proficiency Levels above 10 ppb for cadmium and 25 ppb for lead.

Table 36 presents the statistical analysis of the cadmium and lead levels detected in dairy cow muscle and kidney samples. Table values in green font were calculated using the positive and non-detect samples. With these calculations, a default level of zero was used for non-detects (green font). All other values presented in the table (black font) are applicable to positive samples only.

Table 36. Statistical Analysis of Cadmium and Lead Levels in Kidneys and Muscles from Dairy Cows, 2010 Targeted Assessments Results

Metal	Tissue	Number of Samples	Number of Positive Samples	Percent of Positive Samples	Levels Range (ppb)	Median Levels (ppb)	Mean Levels (ppb)	Standard Deviation	95th percen -tile
Cadmium	Kidney	148	148	100%	22.18-712.20	139.7	165.3	113.0	370.6
Cadmium	Muscle	148	0	0 %	0	0	0	0	0
Lead	Kidney	148	29	19.60%	25.15-676.20 0.00-676.20	58.98 0.00	112.5 22.04	152.4 80.187	548 118.50
Lead	Muscle	148	2	1.35%	25.58-37.48 0.00-37.48	31.53 0.00	31.53 0.43	8.41 3.72	37.48 0.00

INSPECTOR-GENERATED SAMPLING

Suspect Animals

PHVs conduct inspector-generated sampling of suspect animals when an animal is suspected to maintain 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 incorporated the KIS™ test in the top 100 bovine-producing plants in July 2009 and in all bovine plants in August 2010. The KIS™ test will eventually be the primary in-plant screening test for the Agency.

Inspector-generated sampling results are presented in two tables and one figure:

- Table 37 summarizes the total number of samples analyzed (or screened) and the number of animals with violations for each production class.

- Tables 38-40 identifies the results for specific compounds that were detected (violative) within the production class across inspector-generated projects (i.e., collector-generated or COLLGEN, FAST, and KIS™) respectively.

- Figures 31-33 consists of a series of map charts that examine the distribution of residue violations by identified Inspector-generated projects (i.e., collector-generated or COLLGEN, FAST, and KIS™) respectively.

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

Fast Antimicrobial Screen Test (FAST)

FSIS used FAST kits to screen 40,737 samples for antibiotic and sulfonamide residues. Samples that tested positive were analyzed for flunixin, a non-steroidal, anti-inflammatory compound. FSIS laboratories confirmed 58 violations in 45 animals. The residue violations included 1 ampicillin, 4 desfuroylceftiofur (DCA or DCCD), 8 flunixin, 10 gentamycin sulfate, 12 neomycin, 7 oxytetracycline, 7 penicillin, 5 sulfamethazine, and 4 sulfamethoxazole. FAST violation results are represented in Figure 32 and Table 39.

Kidney Inhibition Swab (KIS™) Test

FSIS used KIS™ test kits to screen 170,658 samples for antibiotic and sulfonamide residues. Samples that tested positive were analyzed for flunixin, a non-steroidal anti-inflammatory compound. FSIS laboratories confirmed 1,926 violations in 1,521 animals. The residue violations included 9 ampicillin, 1 chlortetracycline, 85 desfuroylceftiofur (DCA or DCCD), 6 dihydrostreptomycin, 261 flunixin, 171 gentamycin sulfate, 505 neomycin, 61 oxytetracycline, 266 penicillin, 3 sulfadiazine, 195 sulfadimethoxine, 113 sulfamethazine, 43 sulfamethoxazole, 3

sulfathiazole, 42 tetracycline, 88 tilmicosin, 68 tulathromycin, and 6 tylosin. KIS™ test violations results are represented in Figure 33 and Table 40.

2. Samples Confirmed in an FSIS Laboratory

Collector-Generated (COLLGEN)

FSIS analyzed samples collected from 270 animals for antibiotic and sulfonamide residues. FSIS laboratories confirmed 55 violations in 40 animals. The residues included 3 ampicillin, 1 dihydrostreptomycin, 15 flunixin, 3 gentamycin sulfate, 2 moxidectin, 3 neomycin, 3 oxytetracycline, 6 penicillin, 2 sulfadiazine, 6 sulfadimethoxine, 8 sulfamethazine, 2 tetracycline, and 1 tilmicosin. Collector-generated (COLLGEN) violations results are represented in Figure 31 and Table 38.

Show Animals (SHOW)

Analyses were conducted for antibiotic and sulfonamide residue in 51 animals including 1 beef cow, 1 dairy cow, 1 goat, 2 heifers, 8 lambs, 15 market hogs, and 22 steers. No violations were detected.

State or Government Agency Testing (STATE)

Analyses were conducted for antibiotic and sulfonamide residue in 17 animals. Four violations in three animals were found. The residue included one flunixin, one oxytetracycline, and two penicillin.

Additional inspector-generated sampling results for non-violative positive residue samples are detailed in Tables 41-43.

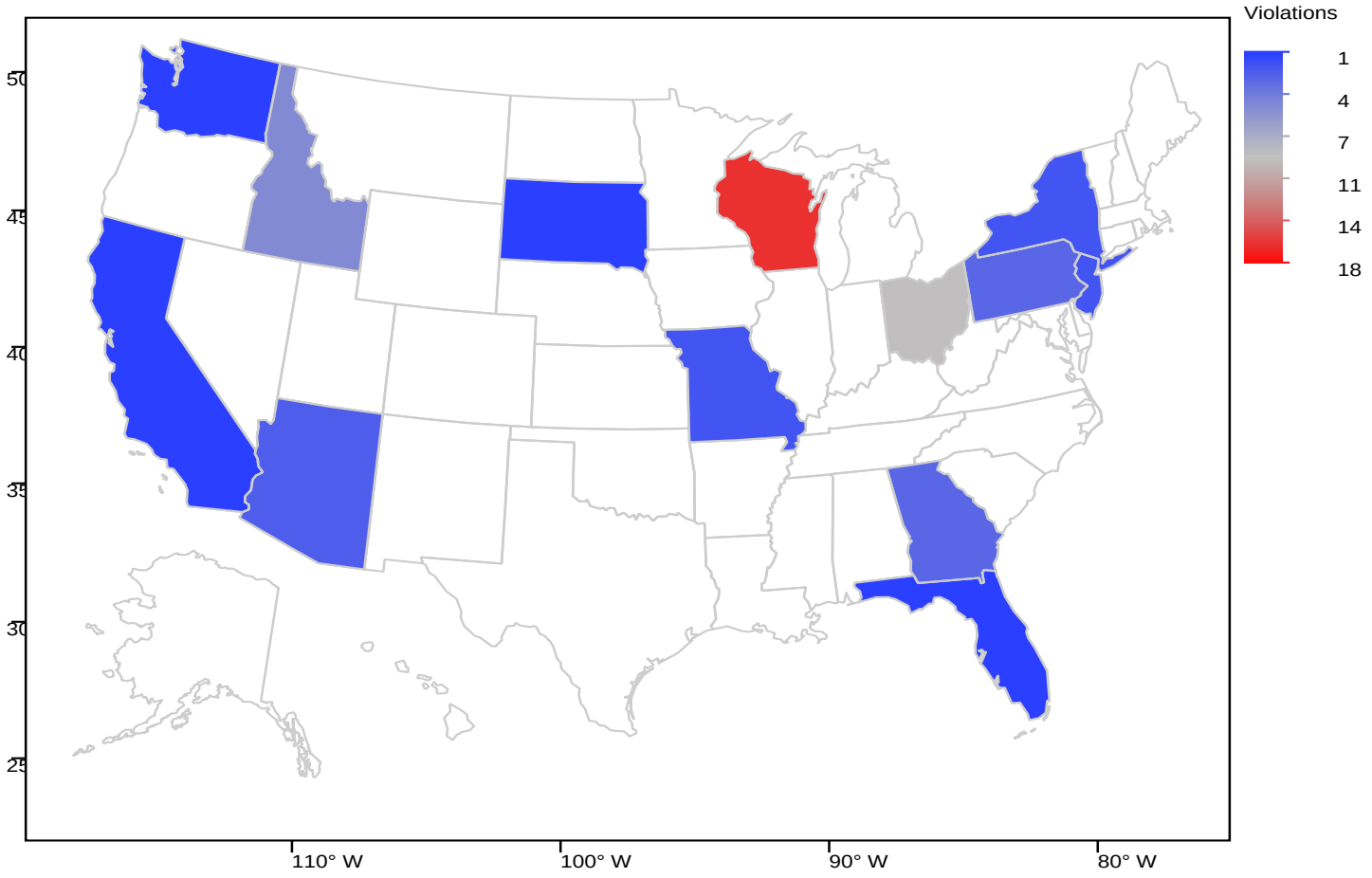
Furthermore, figure 34 consists of a series of pie charts that examine the distribution of residue violations by chemical residue and identified inspector-generated projects (i.e., COLLGEN, FAST, and KIS™) respectively.

Table 37. Summary Results, 2010 Inspector-Generated Sampling (by Project ID)
Antibiotics, Sulfonamide and Non-steroidal Anti-inflammatory (NSAID) Compound [11]

Production Class	COLLGEN		FAST		KIS™		SHOW		STATE	
	Number of Samples	Number of Animals With Confirmed Lab Violations	Number of In-plant (screened) 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	Number of Samples	Number of Animals With Confirmed Lab Violations
Beef Cows	22	3	4,755	7	12,245	74	1	-	4	-
Boars/Stags	1	-	403	-	13	-	-	-	-	-
Bob Veal	19	7	5,568	23	57,609	735	-	-	-	-
Bovine	-	-	-	-	-	-	-	-	2	-
Bulls	8	1	710	-	1,317	6	-	-	2	1
Dairy Cows	150	26	6,108	8	89,663	665	1	-	1	1
Formula-fed Veal	-	-	6	-	1,858	3	-	-	-	-
Goats	28	1	377	-	70	-	1	-	-	-
Heavy Calves	3	1	74	-	330	4	-	-	1	-
Heifers	9	-	965	1	2,367	8	2	-	3	1
Lambs	-	-	1,413	-	64	-	8	-	-	-
Market Hogs	8	-	12,802	3	270	-	15	-	-	-
Mature Sheep	-	-	345	-	1	-	-	-	-	-
Non-formula-fed Veal	-	-	40	1	230	6	-	-	-	-
Roaster Pigs	-	-	737	-	33	-	-	-	-	-
Sows	1	-	4,202	-	13	-	-	-	-	-
Steers	16	1	2,232	2	4,571	20	22	-	4	-
Other*	5	-	-	-	4	-	1	-	-	-
Total	**270**	**40**	**40,737**	**45**	**170,658**	**1,521**	**51**	**-**	**17**	**3**

[11] Samples that are FAST and/or KIS™ positive in the plant are further analyzed for flunixin and phenylbutazone in the laboratory.

Figure 31. Location of Collector-Generated Violations by U.S States
2010 Inspector-Generated Sampling Results

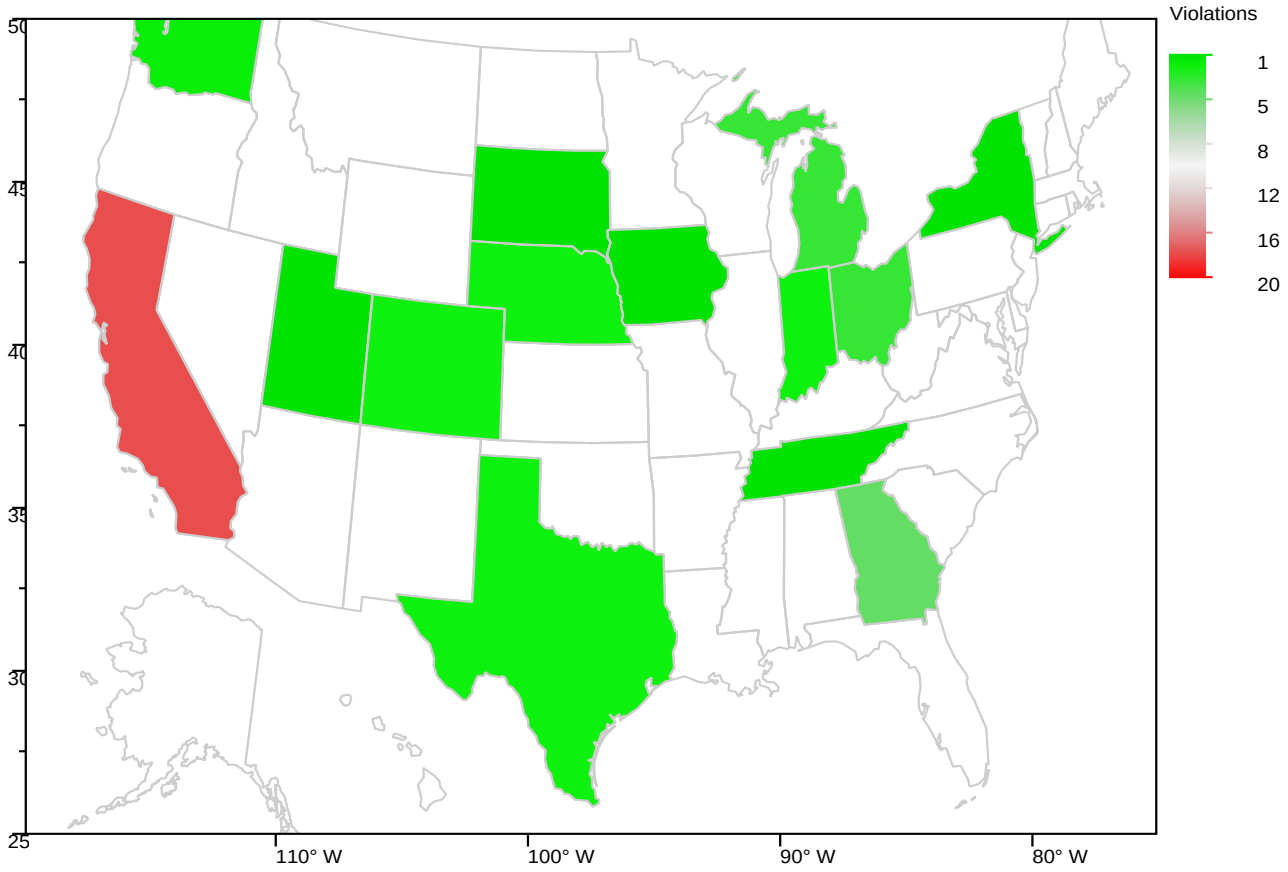


Data Source: FSIS Data Warehouse

Table 38. Distribution of Residue Violations, Chemical Residue, and Animal Class - Project ID (COLLGEN)
2010 Inspector-Generated Sampling

Production Class	Ampicillin	Dihydro Streptomycin	Flunixin	Gentamycin Sulfate	Moxidectin	Neomycin	Oxytetracycline	Penicillin	Sulfadiazine	Sulfadimethoxine	Sulfamethazine	Tetracycline	Tilmicosin	Total
Beef Cows	1	-	2	-	-	-	-	-	-	1	-	-	-	**4**
Bob Veal	-	1	2	1	-	3	-	-	-	-	2	-	-	**9**
Bulls	-	-	-	-	-	-	-	1	-	-	-	-	-	**1**
Dairy Cows	2	-	10	2	-	-	3	5	2	5	2	2	1	**34**
Goats	-	-	-	-	2	-	-	-	-	-	-	-	-	**2**
Heavy Calves	-	-	1	-	-	-	-	-	-	-	2	-	-	**3**
Steers	-	-	-	-	-	-	-	-	-	-	2	-	-	**2**
TOTAL	**3**	**1**	**15**	**3**	**2**	**3**	**3**	**6**	**2**	**6**	**8**	**2**	**1**	**55**

Figure 32. Location of FAST Violations by U.S. States
2010 Inspector-Generated Sampling Results

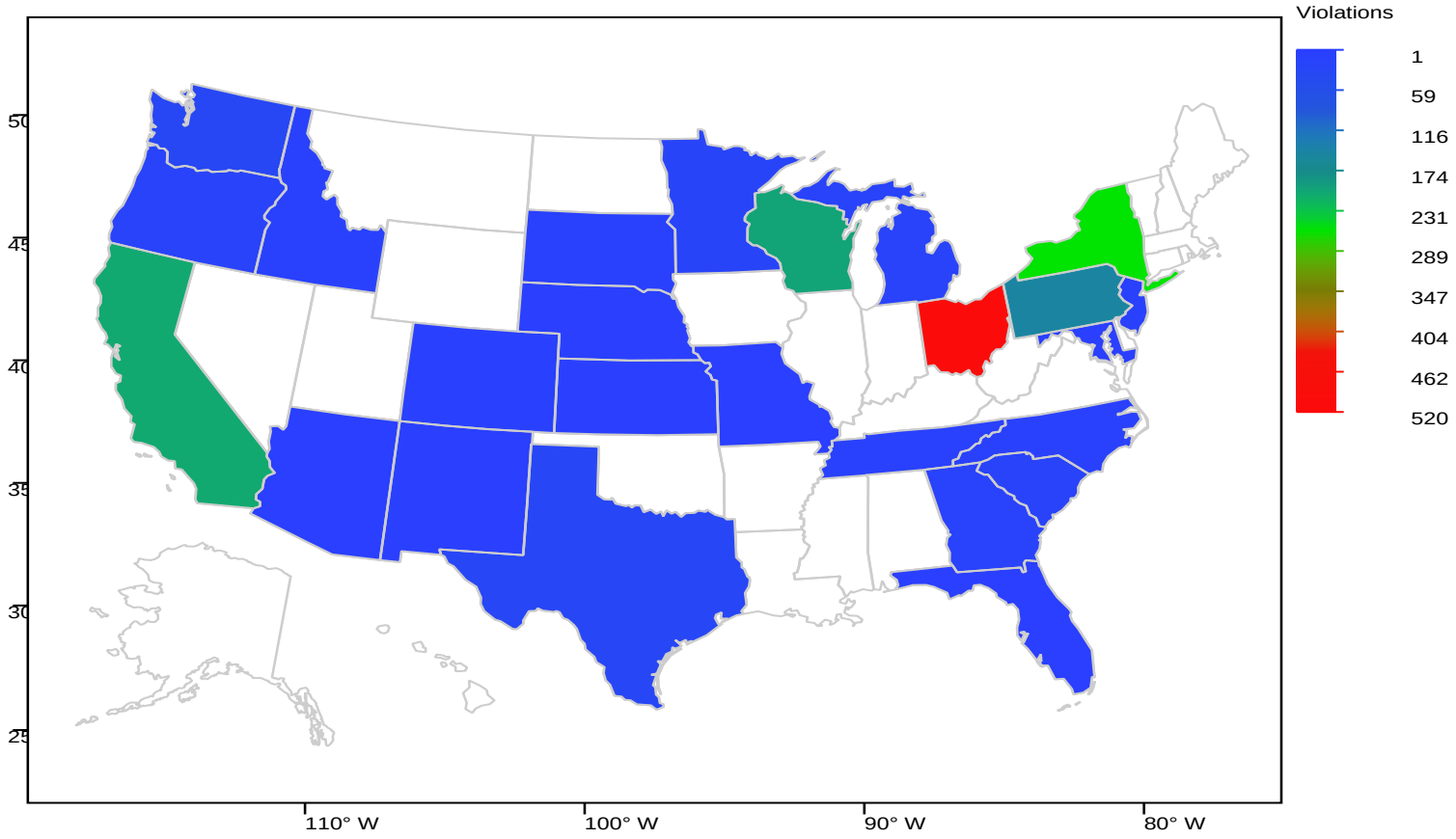


Data Source: FSIS Data Warehouse

Table 39. Distribution of Residue Violations, Chemical Residue, and Animal Class -Project ID (FAST)
2010 Inspector-Generated Sampling

Production Class	Ampicillin	DCCD	Flunixin	Gentamycin Sulfate	Neomycin	Oxytetracycline	Penicillin	Sulfamethazine	Sulfamethoxazole	Total
Beef Cows	-	2	1	2	-	1	4	-	-	10
Bob Veal	-	-	2	6	11	1	-	1	4	25
Dairy Cows	1	1	2	-	-	5	3	-	-	12
Heifers	-	-	-	-	1	-	-	-	-	1
Market Hogs	-	-	-	1	-	-	-	4	-	5
Non-Formula-fed Veal	-	-	-	1	-	-	-	-	-	1
Steers	-	1	3	-	-	-	-	-	-	4
TOTAL	**1**	**4**	**8**	**10**	**12**	**7**	**7**	**5**	**4**	**58**

Figure 33. Location of KIS™ Test Violations by U.S. States
2010 Inspector-Generated Sampling Results



Data Source: FSIS Data Warehouse

Table 40. Distribution of Residue Violations, Chemical Residue, and Animal Class - Project ID (KIS™ Test)
2010 Inspector-Generated Sampling

Production Class	Ampicillin	Chlortetracycline	DCCD	Dihydro Streptomycin	Flunixin	Gentamycin Sulfate	Neomycin	Oxytetracycline	Penicillin	Sulfadiazine	Sulfadimethoxine	Sulfamethazine	Sulfamethoxazole	Sulfathiazole	Tetracycline	Tilmicosin	Tulathromycin	Tylosin	Total
Beef Cows	-	-	1	-	5	10	7	12	22	-	6	13	-	-	1	23	-	-	**100**
Bob Veal	1	-	11	5	56	90	475	21	20	3	32	39	43	2	21	27	66	4	**916**
Bulls	-	-	-	-	-	3	-	-	1	-	2	2	-	-	-	-	-	-	**8**
Dairy Cows	7	-	68	1	191	61	18	28	220	-	153	43	-	1	20	34	-	2	**847**
Formula-fed Veal	-	-	-	-	1	-	1	-	1	-	-	-	-	-	-	-	-	-	**3**
Heavy Calves	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-	-	-	**4**
Heifers	-	-	3	-	1	1	-	-	1	-	1	1	-	-	-	1	-	-	**9**
Non-Formula-fed Veal	-	1	1	-	2	1	1	-	-	-	-	1	-	-	-	-	2	-	**9**
Steers	1	-	1	-	5	3	1	-	1	-	1	14	-	-	-	3	-	-	**30**
TOTAL	**9**	**1**	**85**	**6**	**261**	**171**	**505**	**61**	**266**	**3**	**195**	**113**	**43**	**3**	**42**	**88**	**68**	**6**	**1,926**

Table 41. Distribution of Non-Violative Positive Residue by Production Class and Project ID
2010 Inspector-Generated Sampling Results

Production Class	Project ID					
	FAST	**KIS™**	**COLLGEN**	**SHOW**	**STATE**	**Total**
Beef Cows	47	162	2	-	-	**211**
Boars/Stags	1	-	1	-	-	**2**
Bob Veal	40	2,206	21	-	-	**2,267**
Bovine	-	-	-	-	2	**2**
Bulls	4	25	2	-	2	**33**
Dairy Cows	18	1,167	66	-	-	**1,251**
Formula-fed Veal	-	23	-	-	-	**23**
Heavy Calves	-	143	3	-	3	**149**
Heifers	-	45	16	-	-	**61**
Lambs	2	-	-	-	-	**2**
Market Hogs	31	1	2	1	-	**35**
Non-Formula-fed Veal	1	11	-	-	-	**12**
Roaster Pigs	5	-	-	-	-	**5**
Sows	43	3	1	-	-	**47**
Steers	9	96	5	1	4	**115**
TOTAL	**201**	**3,882**	**119**	**2**	**11**	**4,215**

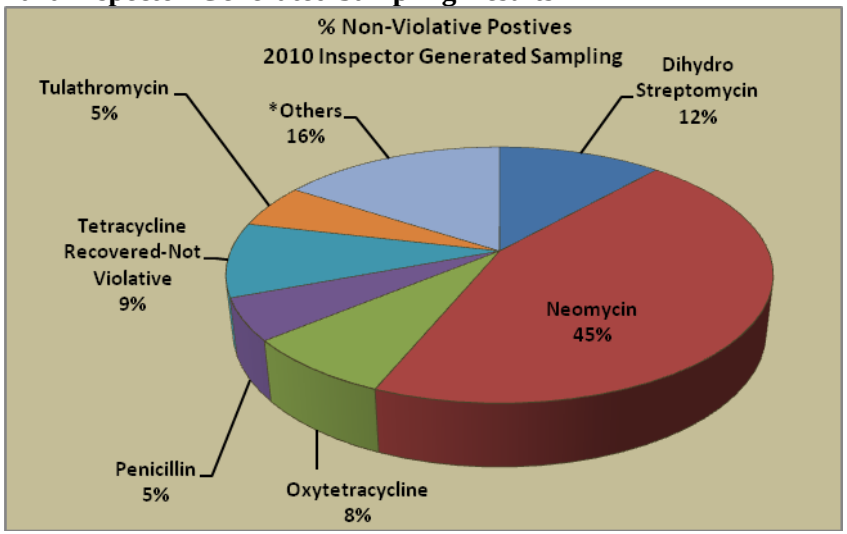
Table 42. Distribution of Non-Violative Positive Residue by Residue Compound Class and Project ID
2010 Inspector-Generated Sampling Results

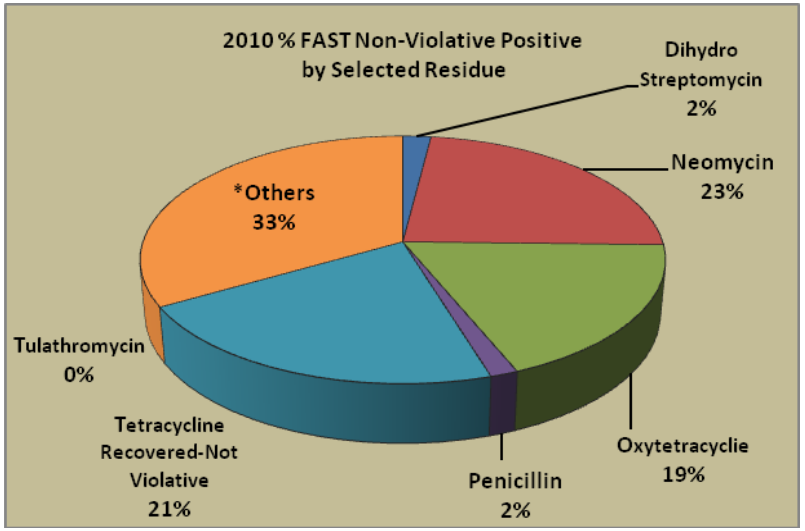
Chemical Residue	Project ID					
	FAST	**KIS ™**	**COLLGEN**	**SHOW**	**STATE**	**Total**
Amikacin	-	2	-	-	-	**2**
Amoxicillin	-	3	-	-	-	**3**
Ampicillin	-	21	4	-	-	**25**
Apramycin	-	2	-	-	-	**2**
beta-Lactams	-	1	-	-	-	**1**
Cefazolin	-	1	-	-	-	**1**
Chlortetracycline	14	78	1	-	2	**95**
DCCD	2	75	9	-	-	**86**
Desacetyl Cephaprin	2	12	1	-	-	**15**
Dihydro Streptomycin	4	477	6	-	-	**487**
Flunixin	4	113	8	-	1	**126**
Gentamycin Sulfate	1	1	-	-	-	**2**
Ivermectin	-	-	1	-	-	**1**
Lincomycin	-	3	-	-	-	**3**
Naficillin	-	2	-	-	-	**2**
Neomycin	47	1,808	29	-	-	**1,884**
Oxytetracycline	37	277	9	-	2	**325**
Penicillin	3	209	10	-	-	**222**
Pirlimycin	-	14	-	-	-	**14**
Spectinomycin	1	20	1	-	-	**22**
Streptomycin	-	11	-	-	-	**11**
Sulfadimethoxine	-	1	-	-	-	**1**
Tetracycline	5	113	1	-	-	**119**
Tetracycline Recovered-Not Violative	43	336	12	2	4	**397**
Tilmicosin	-	40	4	-	-	**44**
Tobramycin	1	3	-	-	-	**4**
Tulathromycin	-	215	18	-	-	**233**
Tylosin	-	7	-	-	-	**7**
Unidentified Analytic	-	2	-	-	2	**4**
Unidentified Microbia	19	25	4	-	-	**48**
Unidentified Microbial Inhibitor	18	10	1	-	-	**29**
TOTAL	**201**	**3,882**	**119**	**2**	**11**	**4,215**

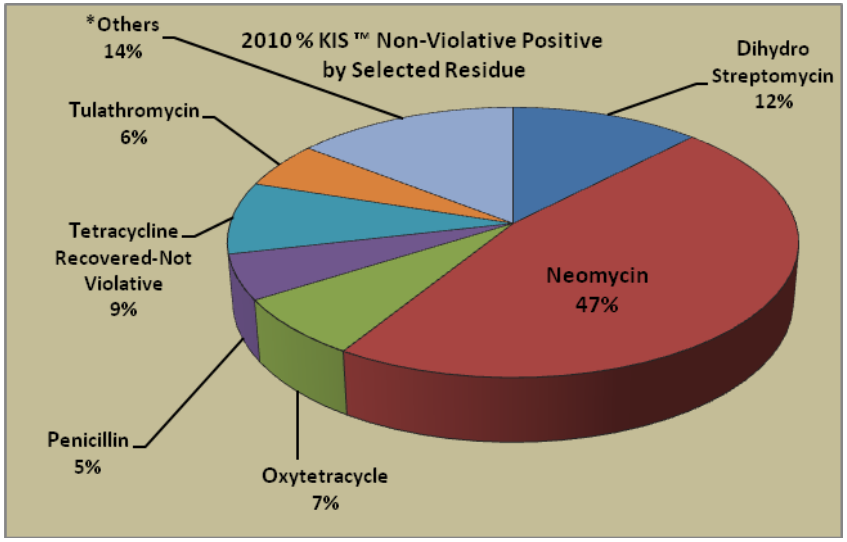
Table 43. Distribution of Non-Violative Positive Residue by Residue Compound Class and Production Class

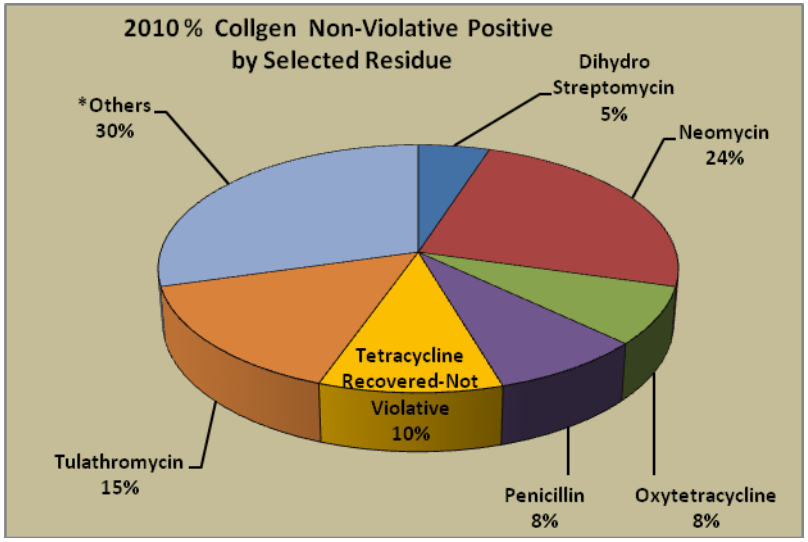
Chemical Residue	Beef Cows	Boars /Stags	Bob Veal	Bovine	Bulls	Dairy Cows	Formula-fed Veal	Heavy Calves	Heifers	Lambs	Market Hogs	Non-Formula-fed	Roaster Pigs	Sows	Steers	Total
Amikacin	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	**2**
Amoxicillin	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	**3**
Ampicillin	-	-	-	-	-	25	-	-	-	-	-	-	-	-	-	**25**
Apramycin	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	**2**
beta-Lactams	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	**1**
Cefazolin	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	**1**
Chlortetracycline	4	-	20	-	-	3	5	36	3	2	8	2	3	1	8	**95**
DCCD	1	-	9	-	-	73	1	-	1	-	-	-	-	-	1	**86**
Desacetyl Cephaprin	1	-	-	-	-	12	-	-	1	-	-	1	-	-	-	**15**
Dihydro Streptomycin	3	-	423	-	-	58	-	2	-	-	-	1	-	-	-	**487**
Flunixin	6	-	-	-	1	115	-	1	1	-	-	-	-	-	2	**126**
Gentamycin Sulfate	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	**2**
Ivermectin	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	**1**
Lincomycin	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	**3**
Naficillin	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	**2**
Neomycin	37	1	1,442	-	7	260	2	67	12	-	13	4	-	2	37	**1,884**
Oxytetracycline	52	-	167	-	5	87	-	5	2	-	-	-	-	1	6	**325**
Penicillin	9	-	7	-	1	200	1	-	2	-	-	1	-	-	1	**222**
Pirlimycin	-	-	7	-	-	7	-	-	-	-	-	-	-	-	-	**14**
Spectinomycin	-	-	15	-	-	6	-	-	-	-	-	-	-	-	1	**22**
Streptomycin	-	-	5	-	-	6	-	-	-	-	-	-	-	-	-	**11**
Sulfadimethoxine	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	**1**
Tetracycline	-	-	24	-	-	94	-	-	-	-	-	-	-	-	1	**119**
Tetracycline Recovered-Not Violative	42	1	116	-	3	160	13	28	5	-	9	2	2	5	11	**397**
Tilmicosin	5	-	4	-	4	26	-	2	-	-	-	1	-	-	2	**44**
Tobramycin	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	**4**
Tulathromycin	47	-	-	-	10	91	-	7	33	-	-	-	-	-	45	**233**
Tylosin	-	-	3	-	-	3	-	1	-	-	-	-	-	-	-	**7**
Unidentified Analytic	-	-	2	2	-	-	-	-	-	-	-	-	-	-	-	**4**
Unidentified Microbia	3	-	12	-	-	8	-	-	1	-	3	-	-	21	-	**48**
Unidentified Microbial Inhibitor	1	-	-	-	-	9	1	-	-	-	2	-	-	16	-	**29**
TOTAL	**211**	**2**	**2,267**	**2**	**33**	**1,251**	**23**	**149**	**61**	**2**	**35**	**12**	**5**	**47**	**115**	**4,215**

Figure 34. Distribution of Non-Violative Positive Samples by Project ID and Selected Chemical Residue
2010 Inspector-Generated Sampling Results









INSPECTOR-GENERATED SAMPLING

Suspect Populations

FSIS tested suspect populations in bob veal for antibiotics, sulfonamides, and *beta*-Agonists.

FAST results for Bob Veal

FSIS field personnel used the FAST test to screen 5,568 samples from bob veal calves for antibiotics and sulfonamides. Of the animals tested, FSIS laboratories confirmed 25 violations in 23 animals. The residue violations consisted of 2 flunixin, 6 gentamycin sulfate, 11 neomycin, 1 oxytetracycline, 1 sulfadiazine, and 4 sulfamethoxazole.

KIS™ test results for Bob Veal

FSIS field personnel used KIS™ tests to screen 57,609 samples from bob veal calves for antibiotics and sulfonamides. Of the animals tested, FSIS laboratories confirmed 916 violations in 735 animals. The residue violations consisted of 1 ampicillin, 11 desfuroylceftiofur (DCA or DCCD), 5 dihydrostreptomycin, 56 flunixin, 90 gentamycin sulfate, 475 neomycin, 21 oxytetracycline, 20 penicillin, 3 sulfadiazine, 32 sulfadimethoxine, 39 sulfamethazine, 43 sulfamethoxazole, 2 sulfathiazole, 21 tetracycline, 27 tilmicosin, 66 tulathromycin, and 4 tylosin.

Show Animals

FSIS laboratories conducted analyses for antibiotics and sulfonamides on two lambs, one market hog, and eight steers. No violations were found.

FSIS laboratories conducted analyses for clenbuterol, salbutamol, ractopamine, and cimaterol (*beta*-Agonists) on 1 beef cow, 1 dairy cow, 1 goat, 2 heifers, 6 lambs, 14 market hogs, and 15 steers. No violations were found.

Import Reinspection Results
Normal Reinspection

Table 44 presents results for imported products subject to normal reinspection. The data include the number of analyses, non-detects, non-violative positives, and violations found for each compound class.

Table 44. Normal Reinspection Results - 2010 Import Residue Plan

Country	Species	Type	Compound Class	Number of Analyses	Number of Non-Detects	Number of Non-Violative Positives	Number of Violations
Argentina	Beef	Processed	Avermectin	4	4	-	-
			Pesticides/Herbicides	2	2	-	-
			Sulfonamides	4	4	-	-
Total by Country				10	10	-	-
Australia	Beef	Fresh	Antibiotics	66	66	-	-
			Avermectin	66	66	-	-
			Chloramphenicol	1	1	-	-
			Florfenicol	2	2	-	-
			Flunixin	2	2	-	-
			Pesticides/Herbicides	58	58	-	-
			Sulfonamides	66	66	-	-
	Goat	Fresh	Avermectin	7	7	-	-
			Pesticides/Herbicides	7	7	-	-
	Pork	Fresh	Antibiotics	1	1	-	-
	Veal	Fresh	Antibiotics	4	4	-	-
			Avermectin	5	5	-	-
			beta-Agonist	7	7	-	-
			Chloramphenicol	5	5	-	-
			Sulfonamides	5	5	-	-
			Thyreostats	6	6	-	-
			Zeranol	7	7	-	-
Total by Country				315	315	-	-
Brazil	Beef	Processed	Avermectin	174	153	-	21
			Pesticides/Herbicides	5	5	-	-
			Sulfonamides	6	6	-	-
Total by Country				185	164	-	21

Table 44. Normal Reinspection Results *(continued)*
2010 Import Residue Plan

Country	Species	Type	Compound Class	Number of Analyses	Number of Non-Detects	Number of Non-Violative Positives	Number of Violations
Canada	Beef	Fresh	Antibiotics	100	100	-	-
			Avermectin	102	102	-	-
			Chloramphenicol	2	2	-	-
			Florfenicol	2	2	-	-
			Flunixin	2	2	-	-
			Pesticides/Herbicides	98	98	-	-
			Sulfonamides	104	104	-	-
	Chicken	Fresh	Antibiotics	77	77	-	-
			Arsenic	70	70	-	-
			Chloramphenicol	71	71	-	-
			Nitroimidazoles	72	72	-	-
			Pesticides/Herbicides	2	2	-	-
	Equine	Fresh	Antibiotics	4	4	-	-
			Sulfonamides	4	4	-	-
	Pork	Fresh	Antibiotics	117	117	-	-
			Pesticides/Herbicides	7	7	-	-
			Sulfonamides	120	120	-	-
	Turkey	Fresh	Antibiotics	8	8	-	-
			Arsenic	8	8	-	-
			Chloramphenicol	8	8	-	-
			Pesticides/Herbicides	7	7	-	-
			Sulfonamides	8	8	-	-
	Veal	Fresh	Antibiotics	32	32	-	-
			Avermectin	31	31	-	-
			beta-Agonist	36	36	-	-
			Chloramphenicol	31	31	-	-
			Sulfonamides	31	31	-	-
			Thyreostats	35	35	-	-
			Zeranol	35	35	-	-
Total by Country				1,224	1,224	-	-

Table 44. Normal Reinspection Results *(continued)*
2010 Import Residue Plan

Country	Species	Type	Compound Class	Number of Analyses	Number of Non-Detects	Number of Non-Violative Positives	Number of Violations
Chile	Beef	Fresh	Antibiotics	10	10	-	-
			Avermectin	10	10	-	-
			Chloramphenicol	10	10	-	-
			Florfenicol	8	8	-	-
			Flunixin	10	10	-	-
			Pesticides/Herbicides	6	6	-	-
			Sulfonamides	9	9	-	-
	Chicken	Fresh	Antibiotics	9	9	-	-
			Arsenic	7	7	-	-
			Chloramphenicol	7	7	-	-
			Nitroimidazoles	9	9	-	-
	Pork	Fresh	Antibiotics	5	5	-	-
			Arsenic	6	6	-	-
			Sulfonamides	6	6	-	-
	Turkey	Fresh	Antibiotics	8	8	-	-
			Arsenic	12	12	-	-
			Chloramphenicol	12	12	-	-
			Pesticides/Herbicides	2	2	-	-
			Sulfonamides	12	12	-	-
Total by Country				158	158	-	-
Costa Rica	Beef	Fresh	Antibiotics	7	7	-	-
			Avermectin	108	108	-	-
			Chloramphenicol	4	4	-	-
			Florfenicol	7	7	-	-
			Flunixin	7	7	-	-
			Pesticides/Herbicides	3	3	-	-
			Sulfonamides	5	5	-	-
Total by Country				141	141	-	-

Table 44. Normal Reinspection Results *(continued)*
2010 Import Residue Plan

Country	Species	Type	Compound Class	Number of Analyses	Number of Non-Detects	Number of Non-Violative Positives	Number of Violations
Croatia	Pork	Processed	Sulfonamides	8	8	-	-
Total by Country				8	8	-	-
Denmark	Pork	Fresh	Antibiotics	17	17	-	-
			Arsenic	3	3	-	-
			Pesticides/Herbicides	1	1	-	-
			Sulfonamides	15	15	-	-
Total by Country				36	36	-	-
Finland	Pork	Fresh	Antibiotics	7	7	-	-
			Arsenic	5	5	-	-
			Sulfonamides	5	5	-	-
Total by Country				17	17	-	-
Germany	Pork	Processed	Sulfonamides	8	8	-	-
Total by country				8	8	-	-
Honduras	Beef	Fresh	Antibiotics	2	2	-	-
			Avermectin	6	5	-	1
			Chloramphenicol	1	1	-	-
			Florfenicol	2	2	-	-
			Flunixin	2	2	-	-
			Pesticides/Herbicides	2	2	-	-
			Sulfonamides	1	1	-	-
Total by Country				16	15	-	1
Hungary	Pork	Processed	Sulfonamides	8	8	-	-
Total by Country				8	8	-	-
Ireland	Pork	Fresh	Antibiotics	8	8	-	-
			Arsenic	7	7	-	-
			Sulfonamides	7	7	-	-
Total by Country				22	22	-	-

Table 44. Normal Reinspection Results *(continued)*
2010 Import Residue Plan

Country	Species	Type	Compound Class	Number of Analyses	Number of Non-Detects	Number of Non-Violative Positives	Number of Violations
Israel	Chicken	Processed	Arsenic	7	7	-	-
	Turkey	Processed	Arsenic	7	7	-	-
			Pesticides/Herbicides	1	1	-	-
			Sulfonamides	7	7	-	-
Total by Country				22	22	-	-
Italy	Pork	Processed	Sulfonamides	8	8	-	-
Total by Country				8	8	-	-
Japan	Beef	Fresh	Antibiotics	2	2	-	-
			Avermectin	2	2	-	-
			Chloramphenicol	2	2	-	-
			Florfenicol	2	2	-	-
			Flunixin	2	2	-	-
			Pesticides/Herbicides	2	2	-	-
			Sulfonamides	2	2	-	-
Total by Country				14	14	-	-
Mexico	Beef	Fresh	Antibiotics	9	9	-	-
			Avermectin	10	10	-	-
			Chloramphenicol	10	10	-	-
			Florfenicol	9	9	-	-
			Flunixin	8	8	-	-
			Pesticides/Herbicides	8	8	-	-
			Sulfonamides	10	10	-	-
	Goat	Fresh	Avermectin	3	3	-	-
	Pork	Fresh	Antibiotics	8	8	-	-
			Arsenic	7	7	-	-
			Sulfonamides	7	7	-	-
	Turkey	Processed	Arsenic	1	1	-	-
			Sulfonamides	1	1	-	-
Total by Country				91	91	-	-

Table 44. Normal Reinspection Results *(continued)*
2010 Import Residue Plan

Country	Species	Type	Compound Class	Number of Analyses	Number of Non-Detects	Number of Non-Violative Positives	Number of Violations
Netherlands	Pork	Fresh	Antibiotics	8	8	-	-
			Arsenic	7	7	-	-
			Sulfonamides	7	7	-	-
Total by Country				22	22	-	-
New Zealand	Beef	Fresh	Antibiotics	55	55	-	-
			Avermectin	56	56	-	-
			Chloramphenicol	1	1	-	-
			Florfenicol	1	1	-	-
			Flunixin	1	1	-	-
			Pesticides/Herbicides	47	47	-	-
			Sulfonamides	56	56	-	-
	Goat	Fresh	Avermectin	5	5	-	-
			Pesticides/Herbicides	4	4	-	-
	Veal	Fresh	Antibiotics	15	15	-	-
			Avermectin	7	7	-	-
			beta-Agonist	15	15	-	-
			Chloramphenicol	7	7	-	-
			Sulfonamides	7	7	-	-
			Thyreostats	15	15	-	-
			Zeranol	13	13	-	-
Total by Country				305	305	-	-
Nicaragua	Beef	Fresh	Antibiotics	8	8	-	-
			Avermectin	11	11	-	-
			Chloramphenicol	4	4	-	-
			Florfenicol	3	3	-	-
			Flunixin	3	3	-	-
			Pesticides/Herbicides	12	12	-	-
			Sulfonamides	11	11	-	-
Total by Country				52	52	-	-

Table 44. Normal Reinspection Results *(continued)*
2010 Import Residue Plan

Country	Species	Type	Compound Class	Number of Analyses	Number of Non-Detects	Number of Non-Violative Positives	Number of Violations
Northern Ireland	Pork	Fresh	Antibiotics	9	9	-	-
			Arsenic	8	8	-	-
			beta-Agonist	1	1	-	-
			Sulfonamides	8	8	-	-
Total by Country				26	26	-	-
Poland	Pork	Fresh	Antibiotics	6	6	-	-
			Arsenic	6	6	-	-
			Sulfonamides	6	6	-	-
Total by Country				18	18	-	-
Spain	Pork	Fresh	Antibiotics	6	6	-	-
			Arsenic	4	4	-	-
			Sulfonamides	4	4	-	-
Total by Country				14	14	-	-
Sweden	Pork	Fresh	Antibiotics	3	3	-	-
			Arsenic	3	3	-	-
			Sulfonamides	3	3	-	-
Total by Country				9	9	-	-
United Kingdom	Pork	Fresh	Antibiotics	8	8	-	-
			Arsenic	7	7	-	-
			Sulfonamides	7	7	-	-
Total by Country				22	22	-	-
Uruguay	Beef	Fresh	Antibiotics	5	5	-	-
			Avermectin	6	6	-	-
			Chloramphenicol	5	5	-	-
			Florfenicol	5	5	-	-
			Flunixin	5	5	-	-
			Pesticides/Herbicides	5	5	-	-
			Sulfonamides	6	6	-	-
		Processed	Avermectin	1	1	-	-
Total by Country				38	38	-	-
TOTAL IMPORT (Normal)				**2,789**	**2,767**	**-**	**22**

Table 45 presents the results for import products subject to increased reinspection. The data include the number of analyses, non-detects, non-violative positives, and violations found for each compound class tested by product class.

Table 45. Increased Reinspection Results
2010 Import Residue Plan

Country	Species	Type	Compound Class	Number of Analyses	Number of Non-Detects	Number of Non-Violative Positives	Number of Violations
Brazil	Beef	Processed	Avermectin	4	4	-	-
Total by Country				4	4	-	-
Mexico	Beef	Fresh	Pesticides/Herbicides	1	1	-	-
Total by Country				1	1	-	-
TOTAL IMPORT (Increased)				**5**	**5**	**-**	**-**

Intensified Reinspection

Table 46 presents results for import products subject to intensified reinspection. The data include the number of analyses, non-detects, non-violative positives, and violations found for each compound class tested by product class.

Table 46. Intensified Reinspection Results
2010 Import Residue Plan

Country	Species	Type	Compound Class	Number of Analyses	Number of Non-Detects	Number of Non-Violative Positives	Number of Violations
Brazil	Beef	Processed	Avermectin	19	17	-	2
Total by Country				19	17	-	2
Costa Rica	Beef	Fresh	Avermectin	14	14	-	-
Total by Country				14	14	-	-
Honduras	Beef	Fresh	Avermectin	16	16	-	-
Total by Country				16	16	-	-
TOTAL IMPORT (Intensified)				**49**	**47**	**-**	**2**

APPENDIX I
FSIS Laboratory Analytical Methods

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

The FSIS Analytical Chemistry Laboratory Guidebook can be found here:
http://www.fsis.usda.gov/Science/Chemistry_Lab_Guidebook/index.asp

Once posted, more recent versions of the methods can be found by accessing the above link.

Antibiotics: Screen and bioassay

- Screening and Confirmation of Animal Drug Residues by UHPLC-MS-MS
- Bioassay for the Detection, Identification and Quantitation of Antimicrobial Residues in Meat and Poultry Tissue

Antibiotics: Aminoglycosides

Screening and Confirmation for Aminoglycosides by UHPLC-MS-MS

Antibiotics: *beta*-Lactams

Screening and Confirmation of β-Lactam Antibiotics by HPLC-MS/MS

Antibiotics: Fluoroquinolones

Confirmation of Fluoroquinolone Antibiotics by HPLC Ion Trap Mass Spectrometry

Antibiotics: Macrolides

Confirmation of Macrolide/Lincosamide Antibiotics by Ion Trap HPLC/MS/MS

Antibiotics: Tetracyclines

Qualitative Identification of Tetracyclines in Tissues

Avermectins

- Determination of Ivermectin, Doramectin, and Moxidectin by HPLC
- Liquid Chromatography/Atmospheric Pressure Chemical Ionization Mass Spectrometric (LC/APCI/MS) Confirmation of Ivermectin, Doramectin and Moxidectin

Beta-agonists

- Screening and Confirmation of Beta-Agonists by HPLC-MS-MS
- Determination of Ractopamine Hydrochloride by High Performance Liquid Chromatography

Heavy metals

- Determination of Cadmium and Lead by ICP-MS
- Determination of Arsenic by Atomic Absorption Spectrophotometry

Nitrofurans

Screening and Confirmation of Nitrofuran Metabolites by Liquid Chromatography-Tandem Mass Spectrometry

NSAIDS

- Screening of Flunixin Residues by ELISA
- Determination and Confirmation of Flunixin by HPLC/ESI-MS/MS

Pesticides

- Confirmation of Pesticides by GC/MS/MS
- Screening for Pesticides by LC/MS/MS and GC/MS/MS

Sulfonamides

- Screening of Sulfonamides by Automated Robotic Extraction and Thin Layer Chromatography (TLC)
- Quantitation and Confirmation of Sulfonamides by Liquid Chromatography – Tandem Mass Spectrometry (LC-MS-MS)

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.

Table AII. Statistical Table
2010 U.S. National Residue Program

Percentage % Violative in the Sample (v)	Probability (p) of detecting at least one violation in (n) samples			
	0.90	**0.95**	**0.99**	**0.999**
	Sample size required "n"			
10	22	29	44	66
5	45	59	90	135
1	230	300	459	688
0.5	460	598	919	1,379
0.1	2,302	2,995	4,603	6,905
0.05	4,605	5,990	9,209	13,813

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 (p)

APPENDIX III
Summary of U.S. NRP Scheduled Sampling Data From 2007 to 2009

Antibiotics (7-plate bioassay)

Production Class	CY 2009			CY 2008			CY 2007		
	Number of Analyses	Number of Violations	Specific Antibiotic Violations	Number of Analyses	Number of Violations	Specific Antibiotic Violations	Number of Analyses	Number of Violations	Specific Antibiotic Violations
Beef cows	277	0	-----	------	------	-------	316	0	----------
Boars/Stags	260	0	-----	296	0	-------	364	0	----------
Bob veal	259	1	1 neomycin	253	1	1 gentamycin	----------	----------	----------
Bulls	257	0	-----	292	0	-------	----------	----------	----------
Dairy cows	295	0	-----	246	0	-------	318	0	----------
Ducks	51	0	-----	57	0	-------	----------	----------	----------
Formula-fed	338	0	-----	302	0	-------	343	0	----------
Geese	20	0	-----	------	------	------	----------	----------	----------
Goats	63	0	-----	85	1	1 oxytetra cycline	----------	----------	----------
Heavy calves	68	0	-----	100	0	-------	237	1	1 oxytetra cycline
Heifers	256	0	-----	300	0	-------	302	0	----------
Horses	----	----	-----	------	------	-------	44	0	----------
Lambs	256	0	-----	251	0	-------	----------	----------	----------
Market hogs	296	0	-----	323	0	------	----------	----------	----------
Mature chickens	336	0	-----	------	------	-------	----------	----------	----------

Antibiotics, *continuation*

Production Class	CY 2009			CY 2008			CY 2007		
	Number of Analyses	Number of Violations	Specific Antibiotic Violations	Number of Analyses	Number of Violations	Specific Antibiotic Violations	Number of Analyses	Number of Violations	Specific Antibiotic Violations
Mature sheep	207	0	------	62	0	------	----------	----------	----------
Mature turkeys	264	0	------	----	------	------	----------	----------	----------
Non-formula-fed veal	106	2	1 gentamycin, 1 tilmicosin	102	0	------	255	3	3 gentamycin
Rabbits	52	0	-------	57	0	------	----------	----------	----------
Roaster pigs	297	0	-------	289	0	------	249	0	----------
Sows	257	0	-------	223	0	------	304	0	----------
Steers	293	2	2 gentamycin	318	0	------	----------	----------	----------
Young chickens	321	0	-------	296	0	------	311	0	----------
Young turkeys	325	0	-------	294	0	------	329	0	----------

Arsenic

Production Class	CY 2009		CY 2008		CY 2007	
	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations
Beef cows	279	0	604	1	------	--------
Dairy cows	277	0	------	------	------	--------
Egg products	----	----	------	------	------	--------
Market hogs	281	0	------	------	291	0
Mature chickens	312	0	------	------	318	0
Mature turkeys	-----	----	328	0	------	--------
Young chickens	324	0	------	------	297	0
Young turkeys	----	----	------	-----	------	--------

Avermectins

Production Class	CY 2009			CY 2008			CY 2007		
	Number of Analyses	Number of Violations	Specific Avermectin Violations	Number of Analyses	Number of Violations	Specific Avermectin Violations	Number of Analyses	Number of Violations	Specific Avermectin Violations
Beef cows	228	0	-----	-----	----	------	-------	------	----------
Boars/stags	----	----	-----	287	1	1 ivermectin	-----	----	-------
Bulls	137	1	1 ivermectin	272	1	1 moxidectin	302	1	1 ivermectin
Dairy cows	----	----	-----	-----	----	-------	320	0	
Formula fed veal	250	0	-----	-----	----	-------	-----	----	-------
Goats	86	1	1 ivermectin	227	0	-------	240	2	2 moxidectin
Heavy calves	81	0	-----	117	1	1 doramectin	337	3	1 ivermectin 2 doramectin
Heifers	----	----	-----	-----	----	-------	305	0	-------
Horses	----	----	-----	-----	----	-------	54	0	-------
Lambs	188	0	-----	287	0	-------	268	0	-------
Market hogs	216	0	-----	-----	----	-------	-----	----	-------
Mature sheep	154	0	-----	213	0	-------	227	0	-------
Non-formula-fed	84	0	-----	99	0	-------	298	2	2 ivermectin
Rabbits	----	----	-----	58	--	-------	-----	----	-------
Sows	----	----	-----	311	0	-------	-----	----	-------
Steers	221	0	-----	-----	----	-------	303	1	1 ivermectin

***beta*-Agonists**
(clenbuterol, salbutamol, cimaterol, ractopamine, and zilpaterol)

Production Class	CY 2009		CY 2008		CY 2007	
	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations
Beef cows	----	----	----	----	------	---
Bulls	----	----	----	----	------	---
Bob veal	----	----	------	---	------	--------
Formula-fed veal	----	----	------	---	333	0
Goats	49	0	221	0	------	--------
Heifers	----	----	------	---	306	0
Market hogs	-----	-----	310	0	285	0
Non-formula-fed veal	153	0	111	0	367	0
Steers	170	0	------	---	------	--------

Carbadox

Production Class	CY 2009		CY 2008		CY 2007	
	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations
Market hogs	193	0	305	1	301	1
Roaster pigs	179	2	267	3 / 3	322	1

Chloramphenicol

Production Class	CY 2009		CY 2008		CY 2007	
	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations
Bob veal	247	0	311	0	------	--------
Dairy cows	281	0	------	--------	335	0
Formula-fed veal	-----	-----	------	--------	341	0
Heifers	-----	-----	298	0	------	--------
Mature chickens	-----	-----	332	0	------	--------
Mature turkeys	266	0	330	0	------	--------
Non-formula-fed veal	----	-----	------	--------	------	--------
Steers	264	0	317	0	------	--------
Young chickens	311	0	------	--------	309	0
Young turkeys	-----	-----	------	--------	319	0

Chlorinated hydrocarbons, Chlorinated organophosphates, Organophosphates, Pyrethroids, Environmental contaminants

Production Class	CY 2009			CY 2008			CY 2007		
	Number of Analyses	Number of Violations	Specific Violations	Number of Analyses	Number of Violations	Specific Violations	Number of Analyses	Number of Violations	Specific Violations
Beef cows	----	-------	---------	282	0	------	315	0	----------
Boars/Stags	128	0	---------	236	2	1 hexachloro benzene, 1 mirex	397	4	1 DDT, 2 hepta-chlor, 1 HCB
Bulls	----	-------	---------	-------	-------	---------	---------	----------	----------
Dairy cows	----	-------	---------	302	0	------	330	0	----------
Egg products	----	-------	---------	-------	-------	---------	---------	----------	----------
Formula-fed	----	-------	---------	-------	-------	---------	---------	----------	----------
Goats	95	0	---------	214	0	------	264	1	1 chlordane
Heavy calves	----	-------	---------	117	0	------	---------	----------	----------
Heifers	----	-------	---------	277	0	------	309	0	----------
Horses	----	-------	---------	-------	-------	---------	50	0	----------

Chlorinated hydrocarbons, Chlorinated organophosphates, Organophosphates, Pyrethroids, Environmental contaminants, *continuation*

Production Class	CY 2009			CY 2008			CY 2007		
	Number of Analyses	Number of Violations	Specific Violations	Number of Analyses	Number of Violations	Specific Violations	Number of Analyses	Number of Violations	Specific Violations
Lambs	117	0	------	276	0	------	246	1	1 methoxycholr
Market hogs	302	0	------	-------	-------	------	---------	----------	----------
Mature chickens	----	-------	------	-------	-------	------	---------	----------	----------
Mature sheep	88	0	------	197	0	------	240	0	----------
Mature turkeys	----	-------	------	-------	-------	------	---------	----------	----------
Non-formula-fed veal	----	-------	------	-------	-------	------	---------	----------	----------
Roaster pigs	269	1	PBDE	-------	-------	------	---------	----------	----------
Sows	----	-------	------	228	0	------	323	0	----------
Steers	269	0	------	-------	-------	------	---------	----------	----------
Young chickens	----	-------	------	-------	-------	------	---------	----------	----------
Young turkeys	----	-------	------	-------	-------	------	---------	----------	----------

Florfenicol

Production Class	CY 2009		CY 2008		CY 2007	
	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations
Beef cows	1	0	206	0	-----	------
Bob veal	116	1	-----	-----	-----	-----
Dairy cows	207	0	-----	------	373	0
Formula-fed veal	----	------	-----	------	340	1
Mature chickens	----	------	266	0	-----	------
Non-formula fed veal	102	3	63	0	292	4
Steers	----	------	-----	------	----	-----

Flunixin

Production Class	CY 2009		CY 2008		CY 2007	
	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations
Beef cows	216	0	-----	------	-----	------
Bob veal	----	------	-----	------	-----	------
Bulls	----	------	84	0	-----	------
Dairy cows	231	0	90	0	-----	------
Heavy calves	132	0	-----	------	-----	------

Nitrofurans

Production Class	CY 2009			CY 2008		CY 2007	
	Number of Analyses	Number of Violations	Specific Violations	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations
Dairy cows	214	1	1 furazolidone	237	0	----------	----------
Formula-fed veal	---	---	------	-----	------	----------	----------
Heifers	---	---	------	-----	------	----------	----------
Market hogs	221	0	------	303	0	302	0
Roaster pigs	---	---	------	-----	------	328	0
Steers	---	---	------	-----	------	----------	----------
Sows	209	0	------	295	0	325	0

Nitroimidazoles

Production Class	CY 2009		CY 2008		CY 2007	
	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations
Young chickens	316	0	293	0	306	0
Young turkeys	317	0	-----	------	----------	----------

Sulfonamides

Production Class	CY 2009			CY 2008			CY 2007		
	Number of Analyses	Number of Violations	Specific sulfonamides Violations	Number of Analyses	Number of Violations	Specific sulfonamides Violations	Number of Analyses	Number of Violations	Specific sulfonamides Violations
Beef cows	234	1	1 sulfadimethoxine	---	--	------	312	0	------
Boars/Stags	---	---	---	---	--	------	----------	--------	------
Bob veal	90	0	---	254	1	1 sulfamethoxine	315	2	1 sulfadimethoxine 1 sulfamethazine
Bulls	179	1	1 sulfamethazine	---	--	------	302	0	------
Dairy cows	116	0	---	224	0	------	336	3	1 sulfadimethoxine 2 sulfamethazine
Ducks	240	0	---	---	--	------	-----	--------	------
Egg products	---	---	---	---	--	------	-----	--------	------
Formula-fed veal	247	1	1 sulfadimethoxine	---	--	------	-----	---------	------
Goats	---	----	----	233	--	------	317	0	------
Heavy calves	53	1	1 sulfadimethoxine	122	1	1 sulfamethazine	337	1	1 sulfadimethoxine
Heifers	187	0	----	306	1	1 sulfamethazine	------	-----	-------
Lambs	---	----	----	---	--	------	342	0	-------
Market hogs	101	1	1 sulfamethazine	223	2	1 sulfamethazine	291	2	2 sulfamethazine
Mature chickens	262	0	-----	334	0	------	------	---------	-----
Mature sheep	----	----	----	---	--	------	283	0	------
Mature turkeys	----	----	----	---	--	------	328	0	-----
Non-formula-fed veal	85	0	----	104	1	1 sulfamethazine	382	2	1 sulfadimethoxine 1 sulfamethazine
Roaster pigs	99	1	1 sulfamethazine	230	0	------	327	4	4 sulfamethazine
Sows	----	----	----	314	2	1 sulfamethazine	------	---------	----------
Steers	170	0	----	252	0	------	303	1	1 sulfamethazine
Young chickens	248	0		294	0	------	297	0	----------
Young turkeys	185	0		---	--	------	320	1	1 sulfaquinoxaline

Thyreostats

Production Class	CY 2009		CY 2008		CY 2007	
	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations
Beef cows	216	0	313	0	-----	------
Dairy cows	-----	-----	-----	------	-----	------
Formula-fed veal	-----	-----	-----	------	342	0

Trenbolone

Production Class	CY 2009		CY 2008		CY 2007	
	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations
Formula-fed veal	246	0	93	0	258	0
Non-formula fed	202	0	97	0	-----	------

Zeranol

Production Class	CY 2009		CY 2008		CY 2007	
	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations	Number of Analyses	Number of Violations
Formula-fed veal	80	0	94	0	261	0
Non-formula-fed veal	66	0	97	0	-----	------