

SECTION 3. RESULTS FROM THE 2000 FSIS DOMESTIC MONITORING PLAN, SPECIAL PROJECTS AND ENFORCEMENT PROGRAM¹

This section reports the results from the Domestic Monitoring Plan, Special Projects and Enforcement Program from the 2000 FSIS National Residue Program. Descriptions of the Monitoring Plan, Special Projects and Enforcement Program are found in section 2 on pages 4 and 5. The Enforcement Testing reported in this section includes follow-up samples to a violative finding and samples generated by FSIS veterinarians for suspicious animals.

The domestic random sampling plans are designed to detect, with a predetermined level of confidence, specific compounds in each designated production class. These sampling plans are not designed to provide an estimate of an overall national percentage of violations for all chemical residues or production classes tested. The percentage occurrence of violations or positive findings can be considered representative only within a production class/compound pair. The data on violations reported here should not be summed across either production class or analysis with the intent of arriving at a single value to represent the percentage occurrence of violations over all the species that were tested using a given analysis. This mathematical operation will not produce a statistically valid estimate, given the sample design in use. Care must be taken when making statistical inferences from these data.

The sample selection procedure is designed to approximate the selection of a simple random sample of animals. Within a production class/compound pair, the results of the sampling may be considered as representative of that entire production class population. Hence, the percentage of violations in each pair is a statistically valid estimate of the corresponding production class population percentage. Therefore, the information presented includes these estimates of percent violations, along with appropriate confidence intervals. The two-sided 95% confidence intervals for the population percentage of violations are given (i.e., the probability is approximately 95% that the interval ranging from the lower bound through the upper bound will contain the true population value). The confidence intervals were computed using a binomial distribution.

FSIS employs several multiresidue methods (MRM's). These methods are capable of simultaneous identification and quantitation of multiple residues. Consequently, animals analyzed with an MRM could have more than one violation. Regardless of how many violations are found in a given animal, the results are reported as one violative animal and the number "1" is entered in the table under the column "Number of Violations". The actual number and identity of individual violative residues are reported in the " Specific Violative Residues" section.

¹ Enforcement samples generated by Veterinary Medical Officers and analyzed in a FSIS laboratory

The FSIS Monitoring Plan and Special Projects program often require several different analyses to be carried out on each production class. This reduces sample collection time in the field, shipping costs, and sample preparation time in the laboratory, without compromising the statistical basis of the sampling plan. In such cases, the results of each analysis are reported independently.

In 2000, the FSIS Monitoring Plan and Special Projects program sampled and tested 12 compound classes of drugs and pesticides, comprising approximately 59 residues. Of the 33,648 Monitoring and Special Projects samples analyzed, 165 residue violations were found in 154 animals and egg products. The violations consisted of 129 antibiotics (in 118 animals), four arsenicals, nine avermectins/milbemycins, 14 sulfonamides, two phenylbutazones, three flunixin, and four chlorinated hydrocarbon/chlorinated organophosphate. The majority of the violations were from illegal levels of approved animal drugs, particularly sulfonamides and antibiotics used to prevent or treat bacterial infections. Most antibiotic and sulfonamide residue violations are confined to a relatively small percentage of livestock, poultry and egg products. The most common cause of violations of approved drugs in livestock, poultry, and egg products is a failure to allow an adequate withdrawal time for the drugs to clear the animal's system. The illegal residues are usually concentrated in kidney, liver, or fat rather than muscle meat. The FSIS sampling focuses on kidney and liver tissues, since most FDA limits are established for these tissues.

Tables 3.1 through 3.7, *2000 FSIS Domestic Residue Plan Results*, present the following information for each analysis conducted under the Monitoring Plan and Special Projects: the total number of animals (or the number of composite samples in the case of poultry) or egg products sampled; the number of violations and non-violative positives (i.e., compounds detected at a level equal to or below the established tolerance) detected; the percent violations; and the confidence interval for the percent violations. These tables also present the number of analyses, number of violations, and number of non-violative positives for those Enforcement Test samples sent directly to the FSIS laboratories for analysis. Table 3.8, *Cumulative Totals by Production Class*, presents the cumulative totals (number of animals sampled) by each production class, and Table 3.9, *Cumulative Totals by Compound Class*, presents the cumulative totals (number of animals sampled) by each analysis.

ANTIBIOTICS RESULTS

An antibiotic is a chemical substance, which has the capacity, in dilute solutions, to inhibit the growth of microorganisms or destroy them. In 2000, FSIS analyzed 7,834 Domestic Monitoring Plan and Special Project samples for antibiotic residues using the 7-plate Bioassay method. One hundred and twenty-nine antibiotic violations were detected in 118 animals from all production classes. The following antibiotics are quantitated by the FSIS 7-plate Bioassay multi-residue method and associated follow-up analytical methodologies.

Bacitracin	Hygromycin	Streptomycin
Chlortetracycline	Neomycin	Tetracycline
Erythromycin	Novobiocin	Tilmicosin
Flavomycin	Oxytetracycline	Tylosin
Gentamicin sulfate	Penicillins	

The results of the antibiotic 7-plate Bioassay testing are in Table 3.1 below.

Table 3.1
Antibiotics by Bioassay
2000 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects					Enforcement Testing		
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval	Analyses	Number of non-violative positives	Number of violations
Horses ²	434	26	66	15.2	(12.0,19.0)	1	0	1
Bovine-(unspecified)						3	0	0
Bulls	250	0	0	0.0	(0.0,1.5)	8	1	1
Beef cows	301	1	1	0.3	(0.0,1.8)	38	7	4
Dairy cows	726	6	7	1.0	(0.4,2.0)	69	9	13
Heifers	509	1	0	0.0	(0.0,0.7)	12	0	1
Steers	481	1	0	0.0	(0.0,0.7)	18	2	2
Bob veal	365	24	7	1.9	(0.8,3.9)	2	1	0

² Multiple violations were found in some animals

Table 3.1 - continued
Antibiotics by Bioassay
2000 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects					Enforcement Testing		
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval	Analyses	Number of non-violative positives	Number of violations
Formula-fed veal	714	68	4	0.6	(0.2,1.4)	1	0	0
Non-formula-fed veal	132	2	0	0.0	(0.0,2.8)	1	0	0
Heavy calves	141	2	1	0.7	(0.0,3.9)	0	0	0
Sheep	160	4	0	0.0	(0.0,2.3)	0	0	0
Lambs	316	3	1	0.3	(0.0,1.8)	2	0	0
Goats	236	0	0	0.0	(0.0,1.6)	0	0	0
Porcine-(unspecified)						13	4	0
Market hogs	723	126	6	0.8	(0.3,1.8)	99	17	5
Boar/Stags	183	23	3	1.6	(0.3,4.7)	0	0	0
Roaster pigs	113	20	4	3.2	(1.0,8.8)	0	0	0
Sows	278	31	6	2.1	(0.8,4.6)	17	3	2
Young chickens	444	3	1	0.2	(0.0,1.2)	8	0	0
Mature chickens	242	0	1	0.4	(0.0,2.3)	7	0	0
Young turkeys	441	11	0	0.0	(0.0,0.8)	1	0	0
Mature turkeys	138	10	0	0.0	(0.0,2.6)	0	0	0
Ostrich						1	0	0
Ducks	328	4	0	0.0	(0.0,1.1)	0	0	0
Rabbits	179	85	10	5.0	(2.7,10.03)	5	4	1
Total	7,834	451	118			306	48	30

SPECIFIC ANTIBIOTIC VIOLATIVE RESIDUES

Monitoring and Special Projects:

Horses: 59 streptomycin, 9 penicillin, 1 oxytetracycline, 1 chlortetracycline, 1 gentamicin sulfate

Beef cows: 1 penicillin

Dairy cows: 1 penicillin, 1 streptomycin, 1 neomycin, 4 gentamicin sulfate

Bob veal: 2 streptomycin, 1 erythromycin, 4 neomycin, 1 gentamicin sulfate

Formula-fed veal: 2 penicillin, 2 gentamicin sulfate

Lambs: 1 penicillin

Heavy calves: 1 penicillin

Market hogs: 6 penicillin

Boars/Stags: 3 penicillin

Roaster pigs: 6 streptomycin, 1 chlortetracycline, 1 gentamicin sulfate

Sows: 6 penicillin, 1 gentamicin sulfate

Young chickens: 1 streptomycin

Mature chickens: 1 penicillin

Rabbits: 7 penicillin, 3 streptomycin

Enforcement Testing:

Horses: 1 streptomycin

Bulls: 1 penicillin, 1 gentamicin sulfate

Steers: 2 oxytetracycline, 3 tilmicosin

Beef cows: 1 penicillin, 3 gentamicin sulfate, 3 tilmicosin

Heifers: 1 oxytetracycline

Dairy cows: 14 penicillin, 1 neomycin, 1 oxytetracycline, 1 gentamicin sulfate

Market hogs: 4 penicillin, 1 streptomycin

Sows: 1 penicillin, 1 streptomycin

Rabbits: 1 streptomycin

TILMICOSIN RESULTS

Tilmicosin is a macrolide used for the treatment of bovine respiratory disease. In 2000, FSIS analyzed 803 Domestic Monitoring Plan samples for tilmicosin by liquid-liquid extraction with quantitation by ion pairing High-Pressure Liquid Chromatography/Ultraviolet Spectrophotometry (HPLC/UV) and no violations were found. The results of the analytical testing are in Table 3.2 below.

Table 3.2
Tilmicosin
2000 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects					Enforcement Testing		
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval	Analyses	Number of non-violative positives	Number of violations
Beef cows	275	0	0	0.0	(0.0,1.3)	0	0	0
Dairy cows	286	0	0	0.0	(0.0,1.3)	0	0	0
Steers	242	0	0	0.0	(0.0,1.5)	0	0	0
Total	803	0	0			0	0	0

SULFONAMIDES RESULTS

Sulfonamides are a group of sulfa drugs, some with bacteriostatic activity, used to treat infections. In 2000, FSIS analyzed 6,623 Domestic Monitoring Plan and Special Project samples and 14 violations were detected in 14 animals from all production classes. The following sulfonamides are analyzed for residue violations.

Sulfabromomethazine	Sulfaguanidine	Sulfaphenazole
Sulfacetamide	Sulfamerazine	Sulfapyridine
Sulfachlorpyridazine	Sulfamethazine	Sulfaquinoxaline
Sulfadiazine	Sulfamethizole	Sulfasalazine
Sulfadimethoxine	Sulfamethoxazole	Sulfathiazole
Sulfadoxine	Sulfamethoxypyridazine	Sulfatroxazole
Sulfaethoxypyridazine	Sulfanilamide	Sulfisoxazole

The results from the sulfonamide testing are reported in Table 3.3 below.

Table 3.3
Sulfonamides
2000 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects					Enforcement Testing		
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval	Analyses	Number of non-violative positives	Number of violations
Horses	224	0	1	0.4	(0.0,2.5)	1	0	0
Bovine-(unspecified)						1	0	0
Bulls	331	1	1	0.3	(0.0,1.7)	8	1	1
Beef cows	292	0	1	0.3	(0.0,1.9)	25	0	4
Dairy cows	329	0	0	0.0	(0.0,1.1)	49	0	3
Heifers	508	0	0	0.0	(0.0,0.1)	12	0	0
Steers	493	0	2	0.4	(0.0,1.5)	21	0	2
Bob veal	363	0	1	0.3	(0.0,1.5)	2	0	0
Formula-fed veal	245	0	0	0.0	(0.0,1.5)	1	0	0
Non-formula-fed veal	141	1	2	1.4	(0.2,5.0)	1	0	0
Heavy calves	146	0	0	0.0	(0.0,2.5)	0	0	0
Sheep	41	0	0	0.0	(0.0,8.6)	0	0	0
Lambs	311	0	0	0.0	(0.0,1.2)	0	0	0
Goats	237	0	0	0.0	(0.0,1.5)	5	0	0
Porcine-(unspecified)						13	0	0
Market hogs	481	2	6	1.2	(0.5,2.7)	56	2	2
Boars/Stags	260	0	0	0.0	(0.0,1.4)	0	0	0
Roaster pigs	94	0	0	0.0	(0.0,3.8)	0	0	0
Sows	410	1	0	0.0	(0.0,0.9)	15	0	0
Young chickens	418	0	0	0.0	(0.0,0.9)	9	0	0

Table 3.3 - continued
Sulfonamides
2000 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects					Enforcement Testing		
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval	Analyses	Number of non-violative positives	Number of violations
Mature chickens	50	0	0	0.0	(0.0,7.1)	7	0	0
Young turkeys	453	2	0	0.0	(0.0,0.8)	6	0	0
Mature turkeys	170	0	0	0.0	(0.0,2.1)	0	0	0
Egg products	365	0	0	0.0	(0.0,1.0)	0	0	0
Ostrich						1	0	0
Rabbits	5	0	0	0.0	(0.0,52.2)	0	0	0
Ducks	256	1	0	0.0	(0.0,1.4)	0	0	0
Total	6,623	8	14			233	3	12

SPECIFIC SULFONAMIDE VIOLATIVE RESIDUES

Monitoring and Special Projects:

Horses: 1 sulfadimethoxine
Bulls: 1 sulfamethazine
Steers: 2 sulfamethazine
Beef cows: 1 sulfamethazine
Bob veal: 1 sulfadimethoxine
Non-formula-fed veal: 1 sulfadimethoxine, 1 sulfamethazine
Market hogs: 5 sulfamethazine, 1 sulfadimethoxine

Enforcement Testing:

Steers: 2 sulfadimethoxine, 2 sulfamethazine
Beef cows: 7 sulfamethazine
Diary cows: 4 sulfadimethoxine, 2 sulfamethazine
Market hogs: 2 sulfamethazine

ARSENICAL RESULTS

Arsenical compounds are used in food-producing animals (swine and poultry) primarily as growth promoters and to prevent bacterial enteritis. In 2000, FSIS analyzed 3,795 Domestic Monitoring Plan and Special Project samples for arsenic and four violations were detected. The results of the arsenical testing are reported in Table 3.4 below.

Table 3.4
Arsenicals
2000 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects					Enforcement Testing		
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval	Analyses	Number of non-violative positives	Number of violations
Beef cows	309	2	0	0.0	(0.0,1.2)	0	0	0
Goats	286	0	0	0.0	(0.0,1.3)	5	0	0
Porcine-(unspecified)						1	0	0
Market hogs	327	3	0	0.0	(0.0,1.1)	1	0	0
Boars/Stags	40	0	0	0.0	(0.0,8.8)	0	0	0
Roaster pigs	92	0	0	0.0	(0.0,3.9)	0	0	0
Sows	221	1	0	0.0	(0.0,1.7)	0	0	0
Young chickens	1155	743	1	0.1	(0.0,0.5)	0	0	0
Mature chickens	240	16	0	0.0	(0.0,1.5)	0	0	0
Young turkeys	455	24	1	0.2	(0.0,1.2)	5	0	0
Mature turkeys	46	2	0	0.0	(0.0,7.7)	0	0	0
Ducks	259	0	2	0.8	(0.1,2.8)	0	0	0
Egg products	365	1	0	0.0	(0.0,1.0)	0	0	0
Total	3,795	792	4			12	0	0

CHLORINATED HYDROCARBONS, CHLORINATED ORGANOPHOSPHATES and PHENYL BUTAZONE RESULTS

Chlorinated hydrocarbons and chlorinated organophosphates are used as insecticides. In 2000, FSIS analyzed 7,474 samples monitored for chlorinated hydrocarbons and chlorinated organophosphates, and four violations were found. Listed below are the chlorinated hydrocarbons and chlorinated organophosphates analyzed.

Aldrin	Chlorpyrifos	Endrin
Benzene hexachloride (BHC)	Coumaphos and oxygen analog	Heptachlor and heptachlor epoxide
Carbophenothion (trithion)	DDT and metabolites	Hexachlorobenzene (HCB)
Chlordane (technical)	Dieldrin	Lindane
2-Chloro-1 (2,4,-dichlorophenyl)vinyl diethyl phosphate [chlorfenvinphos, supona]	Dodecachlorooctahydro-1,3,4-metheno-2H-cyclobuta(cd)pentalene [mirex]	Linuron
2-Chloro-1-(2,4,5-trichlorophenyl)vinyl dimethyl phosphate [stirofos, gardona]	Endosulfan	Methoxychlor
		Phosalone
		Polybrominated biphenyls
		Polychlorinated biphenyls

Phenylbutazone is a nonsteroidal anti-inflammatory drug that is not registered for use in food animals. It can cause aplastic anemia and agranulocytosis. The method used to analyze for chlorinated hydrocarbons and chlorinated organophosphates is used to screen for residues of phenylbutazone. In 2000, FSIS analyzed 7,474 monitoring samples for phenylbutazone and two were found violative. One was detected in a horse and one in a dairy cow. The results of the chlorinated hydrocarbons, chlorinated organophosphates and phenylbutazone analysis are reported in Table 3.5 below.

Table 3.5
Chlorinated Hydrocarbons, Chlorinated Organophosphates (CHC's/COP's) and
Phenylbutazone
2000 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects					Enforcement Testing		
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval	Analyses	Number of non-violative positives	Number of violations
Horses	285	27	1	0.4	(0.0,1.9)	10	1	0
Bovine-(unspecified)						1	0	0
Bulls	346	60	0	0.0	(0.0,1.1)	0	0	0
Beef cows	469	48	0	0.0	(0.0,0.8)	1	0	0
Dairy cows	480	56	1	0.2	(0.0,1.2)	3	0	0
Heifers	520	22	1	0.2	(0.0,1.1)	1	0	0
Steers	484	29	0	0.0	(0.0,0.8)	3	0	0
Bob veal	237	37	0	0.0	(0.0,1.5)	0	0	0
Formula-fed veal	320	2	0	0.0	(0.0,1.2)	0	0	0
Non-formula-fed veal	186	22	0	0.0	(0.0,2.0)	0	0	0
Heavy calves	187	38	0	0.0	(0.0,2.0)	0	0	0
Sheep	225	18	0	0.0	(0.0,1.6)	0	0	0
Lambs	343	34	0	0.0	(0.0,1.1)	5	0	0
Goats	304	36	1	0.3	(0.0,1.2)	0	0	0
Porcine-(unspecified)						4	0	0
Market hogs	493	9	0	0.0	(0.0,0.8)	1	0	0
Boars/Stags	268	17	0	0.0	(0.0,1.4)	0	0	0
Sows	297	12	0	0.0	(0.0,1.2)	0	0	0
Young chickens	446	3	0	0.0	(0.0,0.8)	1	0	0

Table 3.5 - continued
Chlorinated Hydrocarbons, Chlorinated Organophosphates, and Phenylbutazone
2000 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects					Enforcement Testing		
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval	Analyses	Number of non-violative positives	Number of violations
Mature chickens	317	2	0	0.0	(0.0,1.2)	0	0	0
Young turkeys	452	8	2	0.4	(0.0,1.6)	1	0	0
Mature turkeys	132	8	0	0.0	(0.0,2.8)	0	0	0
Ducks	332	2	0	0.0	(0.0,1.1)	0	0	0
Rabbits	70	0	0	0.0	(0.0,5.1)	0	0	0
Egg products	281	0	0	0.0	(0.0,1.3)	0	0	0
Total	7,474	490	6			31	1	0

SPECIFIC CHC's/COP's and PHENYLBUTAZONE VIOLATIVE RESULTS

Monitoring and Special Projects:

Horses: 1 phenylbutazone

Dairy cows: 1 phenylbutazone

Heifers: 1 heptachlor

Goats: 1 chlordane

Young turkeys: 2 lindane

AVERMECTINS (IVERMECTIN and DORAMECTIN) and MILBEMYCINS (MOXIDECTIN) RESULTS

Avermectins and milbemycins are macrocyclic lactones used in animal husbandry against nematode and arthropod parasites. Ivermectin is active against a wide variety of parasites. Doramectin is a potent endectocide that combines broad-spectrum activity with a prolonged duration of activity offering broad-spectrum activity against the major internal and external parasites of cattle. Moxidectin is an antiparasitic drug that is used to control a range of internal and external parasites in sheep, cattle and deer. Nine of 4,582 samples tested in the Domestic Monitoring Plan and Special Projects Program were found violative. The results of the avermectin and milbemycins testing are reported in Table 3.6 below.

**Table 3.6
Avermectins and Milbemycins
2000 FSIS Domestic Residue Plan Results**

Production Class	Monitoring and Special Projects					Enforcement Testing		
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval	Analyses	Number of non-violative positives	Number of violations
Horses	285	0	2	0.7	(0.1,2.5)	0	0	0
Bulls	353	3	0	0.0	(0.0,1.0)	0	0	0
Beef cows	308	4	1	0.3	(0.0,1.8)	11	0	0
Diary cows	322	2	0	0.0	(0.0,1.1)	0	0	0
Heifers	507	0	0	0.0	(0.0,0.7)	0	0	0
Steers	492	0	0	0.0	(0.0,0.7)	11	0	0
Formula-fed veal	220	4	0	0.0	(0.0,1.7)	0	0	0
Non-formula-fed veal	66	0	0	0.0	(0.0,5.4)	0	0	0
Heavy calves	129	3	0	0.0	(0.0,2.8)	0	0	0
Sheep	52	0	0	0.0	(0.0,6.8)	0	0	0
Lambs	259	0	0	0.0	(0.0,1.4)	0	0	0
Goats	468	0	6	1.3	(0.0,2.8)	5	0	0
Market hogs	486	0	0	0.0	(0.0,0.8)	0	0	0
Boars/Stags	112	0	0	0.0	(0.0,3.2)	0	0	0
Roaster pigs	80	0	0	0.0	(0.0,4.5)	0	0	0
Sows	287	0	0	0.0	(0.0,1.3)	0	0	0
Rabbits	156	0	0	0.0	(0.0,2.3)	0	0	0
Total	4,582	16	9			27	0	0

SPECIFIC AVERMECTIN VIOLATIVE RESIDUES

Monitoring and Special Projects:

Horses: 2 ivermectin
Beef cows: 1 ivermectin
Goats: 6 ivermectin

MELENGESTROL ACETATE RESULTS

Melengestrol acetate (MGA) is a progestational and antineoplastic agent used as a growth-stimulating feed additive for beef cattle. In 2000, FSIS analyzed 362 samples for MGA and no violations were found. The results from the testing are reported in Table 3.7 below.

Table 3.7
Melengestrol Acetate
2000 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects					Enforcement Testing		
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval	Analyses	Number of non-violative positives	Number of violations
Steers	98	2	0	0.0	(0.0,3.7)	0	0	0
Heifers	264	15	0	0.0	(0.0,1.4)	0	0	0
Total	362	17	0			0	0	0

FLUOROQUINOLONES

Fluoroquinolones are a modern group of therapeutic antibiotics, which are active against a range of bacteria. In 2000, FSIS analyzed 537 samples for fluoroquinolones and no violations were found. The results from the testing are reported in Table 3.8 below.

Table 3.8
Fluoroquinolones
2000 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects					Enforcement Testing		
	Analyses	Number of non-violative positives	Number of violations	Percent violations	95 percent confidence interval	Analyses	Number of non-violative positives	Number of violations
Dairy cows	288	0	0	0.0	(0.0,1.3)	0	0	0
Young chickens	227	0	0	0.0	(0.0,1.6)	0	0	0
Mature chickens	22	0	0	0.0	(0.0,1.5)	0	0	0
Total	537	0	0			0	0	0

CARBADOX RESULTS

Carbadox is a coccidiostat registered for use in swine. Carbadox is used to control swine dysentery, bacterial swine enteritis, and to increase weight gain. No violations were found in the special projects sampling of 131 roaster pigs.

BETA-AGONISTS (clenbuterol) RESULTS

Clenbuterol, a growth promotant, is not registered for use in food animals in the United States. Clenbuterol is a β -agonist and can cause increased heart rate, muscular tremors, headache, nausea, fever, and chills in people who have eaten the livers of animals that have been treated with clenbuterol. Enforcement testing for clenbuterol was done on the following animals: nine bovine (unspecified class), 114 steers, three heifers, two dairy cows, five formula-fed veal, two sheep, 35 lambs, three goats, and 99 market hogs. 272 animals were tested and no violations were found.

DIETHYLSTILBESTROL RESULTS

Diethylstilbestrol (DES) is a non-steroid, synthetic estrogen. It is the most active of the commonly used stilbene compounds. DES is not approved for use in food producing animals. No violations were found in the Special Project sampling of 297 formula-fed veal.

FLUNIXIN RESULTS

Flunixin is used as a nonsteroidal anti-inflammatory drug and analgesic. Three violations were found in the Special Project sampling of 453 dairy cows. Also enforcement testing for flunixin was done on 11 dairy cows and three violations were found.

NITROIMIDAZOLES RESULTS

Nitroimidazoles are a group of drugs that have both antiprotozoal and antibacterial activity. They act by binding to bacterial DNA and are very effective drugs with excellent distribution in the body. Nitroimidazoles are not approved for use in food producing animals. No violations were found in the Special Project sampling of 452 formula-fed veal.

RACTOPAMINE RESULTS

Ractopamine is used for increased rate of weight gain, improved feed efficiency, increase carcass leanness, and prevention and/or control of porcine proliferative enteropathies (ileitis). No violations were found in the Special Project sampling of 305 market hogs.

TRACE METALS RESULTS

Enforcement testing for trace metals was done on one steer, one sow, and five heifers. There were no violations found.

CUMULATIVE TOTALS – BY PRODUCTION CLASS

The cumulative results from the Domestic Monitoring Plan, Special Products and Enforcement Testing³ analyses by production class are reported in Table 3.8 below.

Table 3.8
Cumulative Totals by Production Class
2000 FSIS Domestic Residue Plan

Production Class	Monitoring and Special Projects: Analyses	Enforcement Testing:Analyses
Horses	1,228	12
Bovine (unspecified)	0	14
Bulls	1,280	16
Beef cows	1,954	75
Dairy cows	2,884	134
Heifers	2,308	33
Steers	2,290	168
Bob veal	965	4
Formula-fed veal	2,248	7
Non-formula-fed veal	525	2
Heavy calves	603	0
Sheep	478	2
Lambs	904	42
Goats	1,531	13
Porcine-(unspecified)	0	31
Market hogs	2,815	256
Boars/Stags	863	0
Roaster pigs	679	0
Sows	1,493	33

³ Domestic follow-up and veterinarian-generated sampling; does not include in-plant testing

Table 3.8 - continued
CUMULATIVE TOTALS by PRODUCTION CLASS
2000 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Projects: Analyses	Enforcement Testing:Analyses
Young chickens	2,690	18
Mature chickens	871	14
Young turkeys	1,801	13
Mature turkeys	486	0
Ducks	1175	0
Rabbits	410	5
Ostrich	0	2
Egg products	1011	0
TOTAL	33,648	899

CUMULATIVE TOTALS – BY COMPOUND CLASS

The cumulative results from the Domestic Monitoring Plan, Special Products and Enforcement Testing analyses by compound class are reported in Table 3.9 below.

Table 3.9
Cumulative Totals by Compound Class
2000 FSIS Domestic Residue Plan

Compound Class	Monitoring and Special Projects: Analyses	Enforcement Testing:Analyses
Antibiotics	7,834	306
Tilmicosin	803	0
Sulfonamides	6,623	233
Arsenic	3,795	12
CHC's/COP's/ phenylbutazone	7,474	31
Avermectins	4,582	27

Table 3.9 - continued
Cumulative Totals by Compound Class
2000 FSIS Domestic Residue Plan Results

Production Class	Monitoring and Special Project: Analyses	Enforcement Testing: Analyses
Melengesterol acetate ⁴	362	0
Fluoroquinolones	537	0
Carbadox	131	0
Clenbuterol	0	272
Diethylstilbestrol	297	0
Flunixin	453	11
Ractopamine	305	0
Nitroimidazoles	452	0
Metals	0	7
TOTAL	33,648	899⁴

⁴ Domestic follow-up and veterinarian-generated sampling; does not include in-plant testing

SECTION 4. RESULTS FROM THE 2000 FSIS DOMESTIC SURVEILLANCE AND ENFORCEMENT PROGRAM⁵

The section reports the results of the FSIS Surveillance Sampling and Enforcement Programs from the 2000 FSIS National Residue Program. As previously stated, the principal goal of the FSIS Enforcement Program is to prevent adulterated meat, poultry, and egg products from entering the food supply. In addition, the Surveillance Sampling Program is designed to distinguish components of livestock, poultry and egg products in which residue problems exist. When there is suspicion of a residue violation, carcasses are first screened on-site by FSIS veterinarians using one of the following rapid screening tests: Calf Antibiotic & Sulfonamide Test (CAST); Swab Test on Premises (STOP); and Fast Antimicrobial Screen Test (FAST). The Sulfa-on-Site (SOS) test is used in the Surveillance Sampling Program. Those samples that test positive by a screening test are sent to an official laboratory for confirmation testing. The number of on-site rapid screening analysis and the number of laboratory confirmed violations per production class for each screen test are described below.

FSIS employs several multi-residue methods (MRM's). These methods are capable of simultaneous identification and quantitation of multiple residues. Consequently, animals analyzed with an MRM could have more than one violation. Regardless of how many violations are found in a given animal, the results are reported as one violative animal and the number "1" is entered in the table under the column "Number of Violations". The actual number and identity of individual violative residues are reported in the "Specific Violative Residues" section.

RESULTS by the SULFA-ON-SITE TEST

The SOS test was used on 8,891 swine to test for sulfonamide residues. Only six samples (0.07%) had violative levels of sulfamethazine.

RESULTS by the CALF ANTIBIOTIC & SULFONAMIDE TEST

CAST was used on 5,474 Bob veal to test for antibiotic and sulfonamide residues. Twenty-six residue violations (0.5%) were found in Bob veal which comprised nine neomycin, eight gentamicin sulfate, three tilmicosin, one each penicillin, streptomycin, tetracycline, oxytetracycline, sulfadimethoxine, and sulfamethazine.

⁵ Includes SOS, CAST, STOP, and FAST analyzed in the plants by Veterinary Medical Officers

RESULTS by the SWAB-TEST ON PREMISES

STOP was used on 34,155 animals to test for antibiotic and sulfonamide residues. Two hundred and twenty one violations were found in 209 animals. Listed below in Table 4.1, *Swab Test on Premises*, is the number of animals screened in the plants and the number of laboratory confirmed violations detected per production class.

Table 4.1
Swab-Test on Premises
2000 FSIS Domestic Residue Plan Results

Production Class	Enforcement Testing		
	Analysis	Number of Violations	Percent Violations
Horses	552	5	0.9
Bulls	423	0	0.0
Steers	2,430	3	0.1
Beef cows	9,367	62	0.6
Heifers	1,389	9	0.6
Dairy cows	14,451	116	0.8
Formula-fed veal	188	1	0.5
Non-formula-fed veal	52	4	7.6
Bob veal	72	2	2.7
Heavy calves	39	1	2.7
Sheep	12	0	0.0
Lambs	668	1	0.15
Goats	63	1	1.5
Market hogs	3,711	1	0.03
Boar/Stags	62	0	0.0
Sows	572	3	0.5
Ostrich	104	0	0.0
TOTAL	34,155	209	

STOP SPECIFIC VIOLATIVE RESIDUES

Horses: 3 penicillin, 3 streptomycin, 1 gentamicin sulfate

Steers: 2 penicillin, 1 erythromycin

Beef cows: 44 penicillin, 1 streptomycin, 1 tetracycline, 2 neomycin, 6 oxytetracycline, 3 gentamicin sulfate, 2 tilmicosin, 5 sulfadimethoxine, 2 sulfamethazine

Heifers: 2 penicillin, 2 streptomycin, 1 oxytetracycline, 2 gentamicin sulfate, 1 tilmicosin, 1 sulfadimethoxine

Dairy cows: 77 penicillin, 4 streptomycin, 3 tetracycline, 2 neomycin, 8 oxytetracycline, 14 gentamicin sulfate, 10 sulfadimethoxine, 4 sulfamethazine

Formula-fed veal: 1 penicillin,

Non-formula-fed veal: 3 penicillin, 1 tilmicosin

Bob veal: 1 penicillin, 1 gentamicin sulfate

Heavy calves: 1 tilmicosin

Lambs: 1 penicillin

Goats: 1 oxytetracycline

Market hogs: 1 streptomycin

Sows: 3 penicillin

RESULTS by the FAST ANTIMICROBIAL SCREEN TEST

FAST was used on 154,834 animals to test for antibiotics and sulfonamides residues and 1,799 violations were found in 1,753 animals tested. Listed below in Table 4.2, *Fast Antimicrobial Screen Test*, is the number of in-plant enforcement screening tests and the number of laboratory confirmed violations per production class.

Table 4.2
Fast Antimicrobial Screen Test
2000 FSIS Domestic Residue Plan Results

Production Class	Enforcement Testing		
	Analyses	Number of Violations	Percent Violations
Bovine	4	4	100
Bulls	657	6	0.9
Steers	1,044	20	1.9
Beef cows	7,642	79	1.0
Heifers	760	20	2.6
Dairy cows	118,946	1,323	1.1
Bob veal	23,561	283	1.2
Formula-fed veal	623	8	1.2
Non-formula-fed veal	214	4	1.8
Heavy calves	115	3	2.6
Market hogs	134	2	1.5
Sows	24	1	4.2
TOTAL	154,834	1,753	

FAST SPECIFIC VIOLATIVE RESIDUES

Bovine: 1 penicillin, 1 tilmicosin, 2 sulfamethazine
Bulls: 1 penicillin, 1 neomycin, 1 oxytetracycline, 2 tilmicosin, 1 sulfamethazine
Steers: 7 penicillin, 1 tylosin, 2 tilmicosin, 6 gentamicin sulfate, 2 sulfadimethoxine, 3 sulfamethazine
Beef cows: 46 penicillin, 1 tylosin, 1 streptomycin, 1 neomycin, 1 oxytetracycline, 1 chlortetracycline, 15 gentamicin sulfate, 5 tilmicosin, 10 sulfadimethoxine, 3 sulfamethazine
Heifers: 7 penicillin, 1 streptomycin, 1 tetracycline, 1 oxytetracycline, 2 gentamicin sulfate, 3 tilmicosin, 2 sulfadimethoxine, 5 sulfamethazine
Dairy cows: 675 penicillin, 33 streptomycin, 24 tetracycline, 5 tylosin, 1 erythromycin, 71 neomycin, 46 oxytetracycline, 1 chlortetracycline, 302 gentamicin sulfate, 16 tilmicosin, 160 sulfadimethoxine, 27 sulfamethazine, 11 sulfadoxine
Bob veal: 37 penicillin, 8 streptomycin, 5 tetracycline, 2 tylosin, 116 neomycin, 8 oxytetracycline, 59 gentamicin sulfate, 1 lincomycin, 1 sulfachlorpyridazine, 30 sulfamethazine, 15 sulfamethoxazole, 18 sulfadimethoxine
Formula-fed veal: 3 penicillin, 1 tetracycline, 4 gentamicin sulfate, 1 tilmicosin,
Non-formula-fed veal: 1 streptomycin, 2 gentamicin sulfates, 1 sulfadimethoxine
Heavy calves: 1 gentamicin sulfate, 1 erythromycin, 1 tilmicosin, 1 sulfamethazine
Market hog: 1 streptomycin, 1 sulfamethazine
Sows: 1 penicillin

CUMULATIVE TOTALS FOR ENFORCEMENT TESTING IN WHICH THE PRE-SCREENING IS DONE ON-SITE BY FSIS VETERINARIANS

The total number of analysis performed by using the in-plant screening enforcement tests is listed in Table 4.3, *Cumulative Totals for On-site Rapid Screening Tests*, below.

**Table 4.3
 Cumulative Totals for On-site Rapid Screening Tests
 2000 FSIS Domestic Residue Plan**

On-site Rapid Screening Tests	Number of Analysis	Violations
Sulfa-on-Site	8,891	6
Calf Antibiotic & Sulfonamide Test	5,474	26
Swab-Test on Premises	43,155	209
Fast Antimicrobial Screen Test	154,834	1,753
TOTALS	212,354	1,994