



United States
Department of
Agriculture

Food Safety
And Inspection
Service

Serotypes Profile of *Salmonella* Isolates from Meat and Poultry Products

January 1998 through December 2010

Background

The Food Safety and Inspection Service (FSIS) issued the [Pathogen Reduction Hazard Analysis and Critical Control Point \(PR/HACCP\) Systems, Final Rule](#), which sets *Salmonella* performance standards for establishments that slaughter or produce selected classes of food animals or raw ground products (Federal Register, 1996). FSIS used the nationwide microbiological baseline studies prior to 1996 to establish the PR/HACCP performance standards for carcasses of cow/bulls, steers/heifers, market hogs, broilers, ground beef, ground chicken, and ground turkey. The performance standards and guidance describe the maximum number of *Salmonella*-positive samples acceptable per sample set. The number of samples in a sample set varies by product class. The maximum number of positive samples acceptable in a set establishes an 80% probability of an establishment passing when it is operating at the standard. Guidance on standards for turkey carcasses is available in the Federal Register (2005).

FSIS initiated the product-specific *Salmonella* limits in large establishments on January 26, 1998, small establishments on January 25, 1999, and very small establishments on January 25, 2000. FSIS inspection personnel randomly collect and submit product samples to one of three FSIS Field Service laboratories in Athens, GA; Alameda, CA; or St. Louis, MO for *Salmonella* analysis, according to procedures described in Appendix E, Federal Register (1996) to verify that establishments meet standards.

The FSIS Field Service laboratories report the analysis results, and the *Salmonella*-positive isolates become eligible for serotyping at the USDA Animal and Plant Health Inspection Service's National Veterinary Services Laboratories in Ames, IA. *Salmonella* testing and serotype data, along with complementary data from molecular and phenotypic analyses, provide an opportunity to examine the association among serotypes isolated on-farm, from meat and poultry products, and from human cases of salmonellosis.

Prior to 2006, there were two phases of the FSIS regulatory program for *Salmonella* in raw products: non-targeted and targeted testing. FSIS collected non-targeted or "A" set samples at establishments randomly selected from the population of eligible establishments with a goal of scheduling every eligible establishment at least once a year. Establishments that failed a set undergo targeted testing, which includes "B", "C", and "D" sets.

Beginning June 2006, FSIS began to schedule establishments based on new criteria that are risk-



based, rather than random (FSIS, 2006). FSIS developed the new sampling program to focus FSIS resources on at-risk establishments with the most samples positive for *Salmonella* and the greatest number of samples with serotypes associated with human salmonellosis (CDC, 2006). Beginning with the second 2006 quarterly report, FSIS summarized serotype data from all sample sets.

Note: The restructuring of *Salmonella* set scheduling prohibits the comparison of results from 2006 onwards to previous years. For such comparisons, nationwide baseline study results provide valid estimates of the prevalence of certain pathogens of public health concern and allow for valid statistical comparisons over time.

From January 1998 through December 2005, FSIS serotyped *Salmonella* isolates for four carcass and three raw ground product classes. Starting in June 2006, FSIS began to serotype *Salmonella* isolates from turkey carcasses. Each of the eight tables presented in this report identifies the ten most commonly isolated *Salmonella* serotypes by calendar year in a specific carcass or raw ground product class. When more than one serotype ranks in tenth place, each serotype in tenth place is listed. The Agency believes that researchers can use this product-specific serotype information to support foodborne pathogen surveillance. FSIS will provide updates of serotype distribution results in future reports. In 2010, FSIS identified Kentucky, as the most common serotype isolated in combined chicken classes; Hadar was most common in the ground turkey class; Montevideo was most common in combined cattle classes; and Derby was most common in the market hog class (Figure 1).

FSIS reviews CDC data for the serotypes isolated from human cases of salmonellosis found in meat and poultry products and those causing human illness (CDC, 2011; CDC, 2006). Some of the more common serotypes isolated from meat and poultry products are rarely isolated from human patients. Conversely, some of the serotypes frequently responsible for human cases of salmonellosis occur in various meat and poultry products. Salmonellosis serotypes identified from human cases also occur in other food and non-food sources.

CDC identifies the ten most common serotypes associated with human infection in the United States: Enteritidis, Newport, Typhimurium, Javiana, 4, [5], 12:i:-, Heidelberg, Saintpaul, Muenchen, Montevideo, and Infantis. Combined, these serotypes account for a majority (75.2%) of human infections in the Foodborne Diseases Active Surveillance Network (FoodNet) sites in 2010, (CDC, 2011). Figures 2–12 identify the percent of the top ten human serotypes in meat and poultry product classes with the exception of Javiana, which is uncommon. Year-to-year variation both within and between product classes, with respect to these more common human serotypes, can be observed. The dominant serotypes identified in 2010 in meat and poultry products (Kentucky, Hadar, and Derby) were not among the top ten serotypes identified in human surveillance data. As reported by the CDC in 2011, Enteritidis and Newport incidence was significantly higher, while the incidence of Typhimurium did not change significantly for 2006–2008.

Human illnesses attributable to *Salmonella* Newport began to rise in the late 1990's. Newport is detected in all FSIS commodities; most frequently in the cattle classes (Figure 5). In 2003, Newport peaked as the most commonly isolated serotype in ground beef. In 2010, the presence of Newport dropped significantly in ground beef. By 2010, this serotype reached zero in cow/bull (Table 3) and



steer/heifer (Table 4), while only five Newport isolates were recovered in ground beef (Table 5).

CDC reported that a *Salmonella* serotype having the antigenic formula 4, [5],12:i:- has been increasingly recognized since the mid-1990's in human illness cases. In 2010, the serotype was the fifth most commonly identified serotype in U.S. human surveillance data. In 2010, 4,[5],12:i:- was the sixth most commonly identified serotype in broiler isolates (Table 1). FSIS laboratories did not report antigenic formulas until 2004. Prior to 2004, serotypes identified solely by antigenic formulas and classified as "monophasic" were included in the "unidentified" isolates category.

FSIS launched a *Salmonella* initiative in 2006 to decrease *Salmonella* contamination of poultry products and other meats. In 2010, the percent of samples from broiler carcasses positive for *Salmonella* was 6.7%, down from 7.2% in 2009, 7.4% in 2008, 8.5% in 2007, 11.4% in 2006, and a high of 16.3% in 2005. Comparing 2009 to 2010 data, FSIS verification testing showed an increase in the proportion of *Salmonella* Enteritidis in broilers and in ground chicken (Figure 4) and a decrease in the proportion of *Salmonella* Heidelberg in broilers. The testing did not indicate a significant change in the proportion of *Salmonella* Heidelberg in ground chicken (Figure 7).

Verification testing is a regulatory sampling program intended to assess the ability of meat and poultry establishments to comply with existing, product-specific performance standards. Serotype profile results are not intended to indicate serotype prevalence within a respective product class. Despite program limitations, FSIS believes that verification testing results presented in this report provide a good indication of relative serotype distributions in raw products for each product class for the 13 years following implementation of the PR/HACCP final rule in federally inspected meat and poultry establishments. FSIS continues to work with public health partners to better identify the proportion of human salmonellosis attributable to FSIS-regulated products.

Results

- FSIS reports serotypes by product class and calendar year based on the date of sample collection from 1998 through 2010. Tables 1–8 include the number of isolates of each serotype and category, the percent of total serotyped isolates, and the percent of total samples collected.
- The ten most common serotypes isolated from a specified product class during a given year are identified by name while less commonly identified serotypes are included in the "other serotypes" category. When there is more than one serotype in tenth place, FSIS lists all serotypes in tenth place.
- FSIS includes entries classified as "not typed" and "unidentified" in the serotype profile. "Not typed" *Salmonella* entries were not serotyped. Unidentified entries include isolates in which a single specific serotype could not be determined. Prior to 2004, FSIS classified serotypes identified solely by antigenic formulas as monophasic, such as 14,[5]12:i:-, and included in the unidentified isolates category.



- From 1998–2005, only “A” set samples were included in the report. Beginning with the second 2006 quarterly report, FSIS summarized data from all samples in the reports.
- FSIS reported variants of serotypes separately. Tables 1, 2, 5, 6, 7, and 8 include data for each product class for combined variants in 2010. Tables 3 and 4 include one variant per serotype observed. Merging variants are most useful in facilitating comparisons of the proportion of *Salmonella* Typhimurium in product classes with human health surveillance data. FSIS combines and reports Typhimurium and Typhimurium 5- as Typhimurium in U.S. human health surveillance data (CDC 2006).
- The figures display the percent of isolates identified out of total isolates serotyped for each product class. The y-axis, the serotype percentage, varies from graph to graph because the percent of different serotypes varies by commodity and year.

Note: The calendar year total for samples analyzed is not always the simple addition of the totals from all four quarters. On occasion, appealed sample results are removed from the totals for verification results.

Tables and Figures

All tables and figures are available in this 121 page PDF document.

References

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Table 1
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 1998	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	139	26.68	2.46
Heidelberg	92	17.66	1.63
Typhimurium (var. Copenhagen)	41	7.87	0.72
Typhimurium	40	7.68	0.71
Hadar	33	6.33	0.58
Schwarzengrund	21	4.03	0.37
Montevideo	16	3.07	0.28
Enteritidis	14	2.69	0.25
Thompson	14	2.69	0.25
Infantis	7	1.34	0.12
Istanbul	7	1.34	0.12
^a Other serotypes	58	11.13	1.02
^b Unidentified isolates	39	7.49	0.69
Total serotyped isolates	521		9.21
Not typed	92		1.63
Total positive	613		10.83
Total number of analyzed samples			
		5,659	

Serotypes 1999	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	188	25.72	2.78
Heidelberg	138	18.88	2.04
Hadar	83	11.35	1.23
Typhimurium (var. Copenhagen)	52	7.11	0.77
Typhimurium	41	5.61	0.61
Thompson	30	4.10	0.44
Litchfield	16	2.19	0.24
Infantis	15	2.05	0.22
Schwarzengrund	12	1.64	0.18
Istanbul	11	1.50	0.16
^a Other serotypes	102	13.95	1.51
^b Unidentified isolates	43	5.88	0.64
Total serotyped isolates	731		10.80
Not typed	41		0.61
Total positive	772		11.41
Total number of analyzed samples			
		6,768	



Table 1—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2000	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	219	25.49	2.18
Heidelberg	198	23.05	1.97
Typhimurium (var. Copenhagen)	57	6.64	0.57
Typhimurium	55	6.40	0.55
Hadar	42	4.89	0.42
Montevideo	37	4.31	0.37
Thompson	27	3.14	0.27
Schwarzengrund	25	2.91	0.25
Enteritidis	23	2.68	0.23
Berta	18	2.10	0.18
^a Other serotypes	112	13.04	1.11
^b Unidentified isolates	46	5.36	0.46
Total serotyped isolates	859		8.54
Not typed	55		0.55
Total positive	914		9.09
Total number of analyzed samples			
		10,057	

Serotypes 2001	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	352	33.59	3.93
Heidelberg	260	24.81	2.90
Typhimurium	67	6.39	0.75
Typhimurium (var. Copenhagen)	35	3.34	0.39
Montevideo	32	3.05	0.36
Schwarzengrund	32	3.05	0.36
Hadar	31	2.96	0.35
Thompson	26	2.48	0.29
Enteritidis	17	1.62	0.19
Berta	13	1.24	0.15
^a Other serotypes	121	11.55	1.35
^b Unidentified isolates	62	5.92	0.69
Total serotyped isolates	1048		11.70
Not typed	17		0.19
Total positive	1065		11.89
Total number of analyzed samples			
		8,955	



Table 1—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2002	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	382	36.28	4.16
Heidelberg	262	24.88	2.85
Typhimurium (var. Copenhagen)	67	6.36	0.73
Hadar	46	4.37	0.50
Typhimurium	46	4.37	0.50
Enteritidis	33	3.13	0.36
Thompson	23	2.18	0.25
Montevideo	20	1.90	0.22
Schwarzengrund	18	1.71	0.20
Infantis	14	1.33	0.15
Mbandaka	14	1.33	0.15
^a Other serotypes	70	6.65	0.76
^b Unidentified isolates	58	5.51	0.63
Total serotyped isolates	1053		11.47
Not typed	6		0.07
Total positive	1059		11.53
Total number of analyzed samples			
		9,183	

Serotypes 2003	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	297	35.96	4.59
Heidelberg	164	19.85	2.54
Typhimurium (var. Copenhagen)	79	9.56	1.22
Typhimurium	50	6.05	0.77
Enteritidis	29	3.51	0.45
Infantis	20	2.42	0.31
Thompson	17	2.06	0.26
Montevideo	17	2.06	0.26
Hadar	15	1.82	0.23
Mbandaka	15	1.82	0.23
^a Other serotypes	79	9.56	1.22
^b Unidentified isolates	44	5.33	0.68
Total serotyped isolates	826		12.77
Not typed	2		0.03
Total positive	828		12.80
Total number of analyzed samples			
		6,468	



Table 1—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2004	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	409	42.74	5.78
Heidelberg	145	15.15	2.05
Typhimurium (var. Copenhagen)	84	8.78	1.19
Enteritidis	58	6.06	0.82
Typhimurium	50	5.22	0.71
^g l 4,5,12:i:-	29	3.03	0.41
Schwarzengrund	27	2.82	0.38
Montevideo	20	2.09	0.28
Mbandaka	15	1.57	0.21
Infantis	12	1.25	0.17
^a Other serotypes	105	10.97	1.48
^b Unidentified isolates	3	0.31	0.04
Total serotyped isolates	957		13.53
Not typed	0		
Total positive	957		13.53
Total number of analyzed samples			
		7,072	

Serotypes 2005	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	703	45.18	7.33
Heidelberg	226	14.52	2.36
Enteritidis	120	7.71	1.25
Typhimurium (var. Copenhagen)	79	5.08	0.82
Typhimurium	68	4.37	0.71
^c 4,5,12:i:-	65	4.18	0.68
Montevideo	54	3.47	0.56
Schwarzengrund	44	2.83	0.46
^c 4,12:i:-	22	1.41	0.23
Thompson	18	1.16	0.19
^a Other serotypes	153	9.83	1.60
^b Unidentified isolates	4	0.26	0.04
Total serotyped isolates	1556		16.22
Not typed	3		0.03
Total positive	1559		16.25
Total number of analyzed samples			
		9,592	



Table 1—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2005 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	703	45.18	7.33
Heidelberg	226	14.52	2.36
^d Typhimurium	147	9.45	1.53
Enteritidis	120	7.71	1.25
^c 4,5,12:i:-	65	4.18	0.68
Montevideo	54	3.47	0.56
Schwarzengrund	44	2.83	0.46
^c 4,12:i:-	22	1.41	0.23
Thompson	18	1.16	0.19
Hadar	16	1.03	0.17
Mbandaka	16	1.03	0.17
^a Other serotypes	121	7.78	1.26
^b Unidentified isolates	4	0.26	0.04
Total serotyped isolates	1556		16.22
Not typed	3		0.03
Total positive	1559		16.25
Total number of analyzed samples			
		9,592	



Table 1 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2006	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	570	48.97	5.58
Enteritidis	159	13.66	1.56
Heidelberg	132	11.34	1.29
Typhimurium (var. Copenhagen)	57	4.90	0.56
^c 4,5,12:i:-	50	4.30	0.49
Typhimurium	37	3.18	0.36
^c 4,12;j:-	20	1.72	0.20
Montevideo	19	1.63	0.19
Schwarzengrund	15	1.29	0.15
Infantis	12	1.03	0.12
Mbandaka	12	1.03	0.12
^a Other serotypes	75	6.44	0.73
^b Unidentified	6	0.52	0.06
Total serotyped isolates	1164		11.41
Not typed	0		
Total positive	1164		11.41
Total number of analyzed samples			
		10,206	



Table 1 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2006 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	570	48.97	5.58
Enteritidis	159	13.66	1.56
Heidelberg	132	11.34	1.29
^d Typhimurium	94	8.08	0.92
^c 4,5,12:i:-	50	4.30	0.49
^c 4,12;i:-	20	1.72	0.20
Montevideo	19	1.63	0.19
Schwarzengrund	15	1.29	0.15
Infantis	12	1.03	0.12
Mbandaka	12	1.03	0.12
^a Other serotypes	75	6.44	0.73
^b Unidentified	6	0.52	0.06
Total serotyped isolates	1164		11.41
Not typed	0		
Total positive	1164		11.41
Total number of analyzed samples			
		10,206	



Table 1 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2007	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	379	47.14	4.03
Heidelberg	108	13.43	1.15
Enteritidis	87	10.82	0.92
Typhimurium (var. Copenhagen)	43	5.35	0.46
Typhimurium	29	3.61	0.31
^c 4,5,12:i:-	20	2.49	0.21
Montevideo	18	2.24	0.19
4,12:i:-	17	2.11	0.18
Berta	12	1.49	0.13
Infantis	12	1.49	0.13
^a Other serotypes	76	9.45	0.81
^b Unidentified	3	0.37	0.03
Total serotyped isolates	804		8.55
Not typed	0		
Total positive	804		8.55
Total number of analyzed samples	9,408		



Table 1 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2007 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	379	47.14	4.03
Heidelberg	108	13.43	1.15
Enteritidis	87	10.82	0.92
^d Typhimurium	72	8.96	0.77
^c 4,5,12:i:-	20	2.49	0.21
Montevideo	18	2.24	0.19
4,12:i:-	17	2.11	0.18
Berta	12	1.49	0.13
Infantis	12	1.49	0.13
Mbandaka	9	1.12	0.10
^a Other serotypes	67	8.33	0.71
^b Unidentified	3	0.37	0.03
Total serotyped isolates	804		8.55
Not typed	0		
Total positive	804		8.55
Total number of analyzed samples	9,408		



Table 1 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2008	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	179	36.83	2.72
Enteritidis	89	18.31	1.35
Heidelberg	63	12.96	0.96
Typhimurium (var. Copenhagen)	35	7.20	0.53
Typhimurium	21	4.32	0.32
^c 4,5,12:i:-	16	3.29	0.24
Infantis	10	2.06	0.15
Montevideo	10	2.06	0.15
Schwarzengrund	7	1.44	0.11
Senftenber	5	1.03	0.08
Thompson	5	1.03	0.08
^a Other serotypes	41	8.44	0.62
^b Unidentified	5	1.03	0.08
Total serotyped isolates	486		7.39
Not typed	0		
Total positive	486		7.39
Total number of analyzed samples			
		6,574	



Table 1 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2008 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	179	36.83	2.72
Enteritidis	89	18.31	1.35
Heidelberg	63	12.96	0.96
^d Typhimurium	56	11.52	0.85
^c 4,5,12:i:-	16	3.29	0.24
Infantis	10	2.06	0.15
Montevideo	10	2.06	0.15
Schwarzengrund	7	1.44	0.11
Senftenber	5	1.03	0.08
Thompson	5	1.03	0.08
^a Other serotypes	41	8.44	0.62
^b Unidentified	5	1.03	0.08
Total serotyped isolates	486		7.39
Not typed	0		
Total positive	486		7.39
Total number of analyzed samples	6,574		



Table 1 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2009	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	183	39.61	2.84
Enteritidis	96	20.78	1.49
Heidelberg	65	14.07	1.01
Typhimurium 5- 8,20:-:z6	21	4.55	0.33
^c 4,5,12:i:-	11	2.38	0.17
Typhimurium	10	2.16	0.16
Montevideo	9	1.95	0.14
Schwarzengrund	8	1.73	0.12
Senftenber	6	1.30	0.09
Worthington	6	1.30	0.09
^a Other serotypes	6	1.30	0.09
^b Unidentified	36	7.79	0.56
Total serotyped isolates	4	0.87	0.06
Not typed	461	99.78	7.16
Total positive	1	0.22	0.02
Total number of analyzed samples			
		462	7.18
		6,439	



Table 1 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2009 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	183	39.61	2.84
Enteritidis	96	20.78	1.49
Heidelberg	65	14.07	1.01
Typhimurium ^d	30	6.49	0.47
8,20:-:z6	11	2.38	0.17
^c 4,5,12:i:-	10	2.16	0.16
Montevideo	8	1.73	0.12
Schwarzengrund	6	1.30	0.09
Senftenber	6	1.30	0.09
Worthington	6	1.30	0.09
^a Other serotypes	36	7.79	0.56
^b Unidentified	4	0.87	0.06
Total serotyped isolates	461	99.78	7.16
Not typed	1	0.22	0.02
*Total positive	462		7.18
Total number of analyzed samples			
		6,439	



Table 1 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2010	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	208	45.41	3.05
Enteritidis	124	27.07	1.82
Typhimurium 5 -	27	5.90	0.40
Heidelberg	16	3.49	0.23
^a Typhimurium	14	3.06	0.21
^c 4,5,12:i:-	10	2.18	0.15
Johannesburg	6	1.31	0.09
Schwarzengrund	5	1.09	0.07
Senftenber	5	1.09	0.07
Berta	4	0.87	0.06
Braenderup	4	0.87	0.06
Thompson	4	0.87	0.06
^a Other serotypes	24	5.24	0.35
^b Unidentified	5	1.09	0.07
Total serotyped isolates	456		6.68
Not typed	2		0.03
*Total positive	458		6.71
Total number of analyzed samples	6,828		



Table 1 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Broilers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2010 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	208	45.41	3.05
Enteritidis	124	27.07	1.82
Typhimurium	41	8.95	0.60
Heidelberg	16	3.49	0.23
^c 4,5,12:i:-	10	2.18	0.15
Johannesburg	6	1.31	0.09
Schwarzengrund	5	1.09	0.07
Senftenber	5	1.09	0.07
Berta	4	0.87	0.06
Braenderup	4	0.87	0.06
Thompson	4	0.87	0.06
^a Other serotypes	24	5.24	0.35
^b Unidentified	5	1.09	0.07
Total serotyped isolates	456		6.68
Not typed	2		0.03
*Total positive	458		6.71
Total number of analyzed samples	6,828		

*The percentages listed for total positive isolates may not equal the sum of the data in the Percent of Analyzed Samples column due to rounding.

^aThe ten most commonly isolated serotypes during a listed year are identified by name while less commonly identified serotypes are included in the “other serotypes” category. When there is more than one serotype in tenth place, all serotypes in tenth place are listed.

^bThe “unidentified” designation includes isolates for which a single specific serotype could not be determined including those that were solely named through antigenic formulas.

^cPrior to 2004, isolates fitting the designation in b were included in the “unidentified isolates” category.

^dTyphimurium includes Typhimurium 5- (formerly Copenhagen).

Note: For information on the most commonly identified serotypes causing human infection in the United States see CDC (2006).



Table 2
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Market Hogs
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 1998	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	13	20.63	0.94
Typhimurium (var. Copenhagen)	10	15.87	0.72
Agona	5	7.94	0.36
Schwarzengrund	4	6.35	0.29
Heidelberg	3	4.76	0.22
London	3	4.76	0.22
Muenchen	3	4.76	0.22
Brandenburg	2	3.17	0.14
Hadar	2	3.17	0.14
Infantis	2	3.17	0.14
Typhimurium	2	3.17	0.14
Worthington	2	3.17	0.14
^a Other serotypes	11	17.46	0.79
^b Unidentified isolates	1	1.59	0.07
Total serotyped isolates	63		4.53
Not typed	18		1.29
Total positive	81		5.83
Total number of analyzed samples			
		1,390	

Serotypes 1999	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	40	28.99	2.08
Typhimurium (var. Copenhagen)	11	7.97	0.57
Heidelberg	8	5.80	0.42
Anatum	7	5.07	0.36
Infantis	7	5.07	0.36
Johannesburg	7	5.07	0.36
Uganda	7	5.07	0.36
Agona	5	3.62	0.26
Manhattan	5	3.62	0.26
Reading	5	3.62	0.26
^a Other serotypes	33	23.91	1.72
^b Unidentified isolates	3	2.17	0.16
Total serotyped isolates	138		7.18
Not typed	51		2.65
Total positive	189		9.83
Total number of analyzed samples			
		1,923	



Table 2—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Market Hogs
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2000	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	66	22.60	1.28
Typhimurium (var. Copenhagen)	47	16.10	0.91
Johannesburg	24	8.22	0.46
Infantis	20	6.85	0.39
Heidelberg	17	5.82	0.33
Anatum	10	3.42	0.19
Typhimurium	9	3.08	0.17
Minnesota	8	2.74	0.15
Brandenburg	7	2.40	0.14
Manhattan	7	2.40	0.14
Reading	7	2.40	0.14
Saintpaul	7	2.40	0.14
Senftenberg	7	2.40	0.14
^a Other serotypes	51	17.47	0.99
^b Unidentified isolates	5	1.71	0.10
Total serotyped isolates	292		5.65
Not typed	31		0.60
Total positive	323		6.25
Total number of analyzed samples			
		5,170	

Serotypes 2001	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	101	33.01	1.25
Infantis	26	8.50	0.32
Anatum	22	7.19	0.27
Typhimurium (var. Copenhagen)	21	6.86	0.26
Saintpaul	14	4.58	0.17
Heidelberg	13	4.25	0.16
Reading	13	4.25	0.16
Johannesburg	11	3.59	0.14
Uganda	10	3.27	0.12
Typhimurium	9	2.94	0.11
^a Other serotypes	63	20.59	0.78
^b Unidentified isolates	3	0.98	0.04
Total serotyped isolates	306		3.78
Not typed	1		0.01
Total positive	307		3.79
Total number of analyzed samples			
		8,090	



Table 2—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Market Hogs
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2002	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	72	30.38	0.96
Typhimurium (var. Copenhagen)	31	13.08	0.41
Infantis	14	5.91	0.19
Saintpaul	14	5.91	0.19
Anatum	13	5.49	0.17
Reading	8	3.38	0.11
Heidelberg	7	2.95	0.09
Johannesburg	7	2.95	0.09
Typhimurium	7	2.95	0.09
Uganda	7	2.95	0.09
^a Other serotypes	57	24.05	0.76
^b Unidentified isolates	0		
Total serotyped isolates	237		3.17
Not typed	0		
Total positive	237		3.17
Total number of analyzed samples		7,479	

Serotypes 2003	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	26	17.22	0.44
Typhimurium (var. Copenhagen)	16	10.60	0.27
Infantis	11	7.28	0.19
Heidelberg	10	6.62	0.17
Saintpaul	8	5.30	0.14
Anatum	8	5.30	0.14
Johannesburg	7	4.64	0.12
Typhimurium	6	3.97	0.10
Reading	5	3.31	0.08
Uganda	4	2.65	0.07
Adelaide	4	2.65	0.07
Brandenburg	4	2.65	0.07
^a Other serotypes	38	25.17	0.64
^b Unidentified isolates	4	2.65	0.07
Total serotyped isolates	151		2.55
Not typed	0		
Total positive	151		2.55
Total number of analyzed samples		5,924	



Table 2—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Market Hogs
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2004	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	70	28.34	0.89
Typhimurium (var. Copenhagen)	42	17.00	0.53
Anatum	27	10.93	0.34
Infantis	19	7.69	0.24
Adelaide	10	4.05	0.13
Johannesburg	9	3.64	0.11
Reading	8	3.24	0.10
Mbandaka	6	2.43	0.08
Muenchen	5	2.02	0.06
Agona	4	1.62	0.05
Brandenburg	4	1.62	0.05
Choleraesuis (var. Kunzendorf)	4	1.62	0.05
Hadar	4	1.62	0.05
Heidelberg	4	1.62	0.05
Typhimurium	4	1.62	0.05
^a Other serotypes	24	9.72	0.31
^b Unidentified isolates	3	1.21	0.04
Total serotyped isolates	247		3.14
Not typed	0		
Total positive	247		3.14
Total number of analyzed samples			
		7,860	

Serotypes 2005	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	73	29.80	1.10
Typhimurium (var. Copenhagen)	29	11.84	0.44
Infantis	22	8.98	0.33
Saintpaul	11	4.49	0.17
Anatum	11	4.49	0.17
Reading	10	4.08	0.15
Johannesburg	9	3.67	0.14
London	9	3.67	0.14
Adelaide	8	3.27	0.12
Heidelberg	6	2.45	0.09
^a Other serotypes	56	22.86	0.84
^b Unidentified isolates	1	0.41	0.02
Total serotyped isolates	245		3.69
Not typed	1		0.02
Total positive	246		3.70
Total number of analyzed samples			
		6,648	



Table 2—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Market Hogs
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2005 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	73	29.80	1.10
^c Typhimurium	33	13.47	0.50
Infantis	22	8.98	0.33
^c Anatum	13	5.31	0.20
Saintpaul	11	4.49	0.17
Reading	10	4.08	0.15
Johannesburg	9	3.67	0.14
London	9	3.67	0.14
Adelaide	8	3.27	0.12
Heidelberg	6	2.45	0.09
^a Other serotypes	50	20.41	0.75
^b Unidentified isolates	1	0.41	0.02
Total serotyped isolates	245		3.69
Not typed	1		0.02
Total positive	246		3.70
Total number of analyzed samples			
		6,648	

Serotypes 2006	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	54	18.49	0.75
Anatum	31	10.62	0.43
Johannesburg	28	9.59	0.39
Anatum var. 15+	26	8.90	0.36
Typhimurium (var. Copenhagen)	20	6.85	0.28
Infantis	16	5.48	0.22
Saintpaul	16	5.48	0.22
Heidelberg	13	4.45	0.18
Agona	10	3.42	0.14
Hadar	10	3.42	0.14
^a Other serotypes	67	22.95	0.93
^b Unidentified	1	0.34	0.01
Total serotyped isolates	292		4.03
Not typed	0		
Total positive	292		4.03
Total number of analyzed samples			
		7,242	



Table 2 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Market Hogs
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2006 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	54	18.49	0.75
^c Anatum	63	21.58	0.87
Johannesburg	28	9.59	0.39
^c Typhimurium	24	8.22	0.33
Infantis	16	5.48	0.22
Saintpaul	16	5.48	0.22
Heidelberg	13	4.45	0.18
Agona	10	3.42	0.14
Hadar	10	3.42	0.14
Manhattan	7	2.40	0.10
^a Other serotypes	50	17.12	0.69
^b Unidentified	1	0.34	0.01
Total serotyped isolates	292		4.03
Not typed	0		
Total positive	292		4.03
Total number of analyzed samples			
		7,242	



Table 2 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Market Hogs
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2007	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	27	13.30	0.37
Typhimurium (var. Copenhagen)	25	12.32	0.34
Johannesburg	20	9.85	0.27
Infantis	17	8.37	0.23
Typhimurium	17	8.37	0.23
Saintpaul	13	6.40	0.18
Adelaide	10	4.93	0.14
London	10	4.93	0.14
Anatum	9	4.43	0.12
Agona	8	3.94	0.11
Hadar	8	3.94	0.11
^a Other serotypes	36	17.73	0.49
^b Unidentified	3	1.48	0.04
Total serotyped isolates	203		2.78
Not typed	0		
Total positive	203		2.78
Total number of analyzed samples			
		7,308	



Table 2 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Market Hogs
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2007 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
^c Typhimurium	42	20.69	0.57
Derby	27	13.30	0.37
Johannesburg	20	9.85	0.27
Infantis	17	8.37	0.23
^c Anatum	13	6.40	0.18
Saintpaul	13	6.40	0.18
Adelaide	10	4.93	0.14
London	10	4.93	0.14
Agona	8	3.94	0.11
Hadar	8	3.94	0.11
^a Other serotypes	32	15.76	0.44
^b Unidentified	3	1.48	0.04
Total serotyped isolates	203		2.78
Not typed	0		
Total positive	203		2.78
Total number of analyzed samples		7,308	



Table 2 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Market Hogs
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2008	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	23	21.10	0.54
Infantis	14	12.84	0.33
Typhimurium (var. Copenhagen)	8	7.34	0.19
Saintpaul	7	6.42	0.16
Agona	6	5.50	0.14
London	6	5.50	0.14
Anatum	5	4.59	0.12
Johannesburg	5	4.59	0.12
Ohio	4	3.67	0.09
Hadar	3	2.75	0.07
Typhimurium	3	2.75	0.07
^a Other serotypes	25	22.94	0.59
^b Unidentified	0		
Total serotyped isolates	109		2.57
Not typed	0		
Total positive	109		2.57
Total number of analyzed samples			
		4,244	



Table 2 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Market Hogs
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2008 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	23	21.10	0.54
Infantis	14	12.84	0.33
^c Typhimurium	11	10.09	0.26
Saintpaul	7	6.42	0.16
Agona	6	5.50	0.14
Anatum	6	5.50	0.14
London	6	5.50	0.14
Johannesburg	5	4.59	0.12
Ohio	4	3.67	0.09
Hadar	3	2.75	0.07
^a Other serotypes	24	22.02	0.57
^b Unidentified	0		
Total serotyped isolates	109		2.57
Not typed	0		
*Total positive	109		2.57
Total number of analyzed samples		4,244	



Table 2 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Market Hogs
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2009	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	21	19.44	0.44
Typhimurium 5-	14	12.96	0.29
Johannesburg	10	9.26	0.21
Infantis	8	7.41	0.17
Anatum	6	5.56	0.13
Adelaide	5	4.63	0.11
Agona	5	4.63	0.11
Bredeney	4	3.70	0.08
Heidelberg	4	3.70	0.08
Saintpaul	4	3.70	0.08
Typhimurium	4	3.70	0.08
^a Other serotypes	23	21.30	0.48
^b Unidentified	0		
Total serotyped isolates	108		2.28
Not typed	0		
Total positive	108		2.28
Total number of analyzed samples			
		4,747	



Table 2 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Market Hogs
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2009 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	21	19.44	0.44
^c Typhimurium	18	16.67	0.38
Johannesburg	10	9.26	0.21
Infantis	8	7.41	0.17
Anatum	6	5.56	0.13
Adelaide	5	4.63	0.11
Agona	5	4.63	0.11
Bredeney	4	3.70	0.08
Heidelberg	4	3.70	0.08
Saintpaul	4	3.70	0.08
^a Other serotypes	23	21.30	0.48
^b Unidentified	0		
Total serotyped isolates	108		2.28
Not typed	0		
*Total positive	108		2.28
Total number of analyzed samples		4,747	



Table 2 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Market Hogs
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2010	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	17	16.83	0.40
Saintpaul	11	10.89	0.26
Typhimurium 5-	11	10.89	0.26
Infantis	8	7.92	0.19
Adelaide	7	6.93	0.17
Johannesburg	7	6.93	0.17
London	6	5.94	0.14
Heidelberg	5	4.95	0.12
Agona	4	3.96	0.09
Anatum	3	2.97	0.07
Cerro	3	2.97	0.07
Choleraesuis	3	2.97	0.07
^a Other serotypes	13	12.87	0.31
^b Unidentified	3	2.97	0.07
Total serotyped isolates	101		2.39
Not typed	0		0.00
Total positive	101		2.39
Total number of analyzed samples			
		4,224	



Table 2 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Market Hogs
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2010 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	17	16.83	0.40
^c Typhimurium	13	12.87	0.31
Saintpaul	11	10.89	0.26
Infantis	8	7.92	0.19
Adelaide	7	6.93	0.17
Johannesburg	7	6.93	0.17
London	6	5.94	0.14
Heidelberg	5	4.95	0.12
Agona	4	3.96	0.09
Anatum	3	2.97	0.07
Cerro	3	2.97	0.07
Choleraesuis	3	2.97	0.07
^a Other serotypes	11	10.89	0.26
^b Unidentified	3	2.97	0.07
Total serotyped isolates	101		2.39
Not typed	0		
Total positive	101		2.39
Total number of analyzed samples		4,224	

*The percentages listed for total positive isolates may not equal the sum of data in the Percent of Analyzed Samples column due to rounding.

^a The ten most commonly isolated serotypes during a listed year are identified by name while less commonly identified serotypes are included in the “other serotypes” category. When there is more than one serotype in tenth place, all serotypes in tenth place are listed.

^bThe “unidentified” designation includes isolates for which a single specific serotype could not be determined including those that were solely named through antigenic formulas.

^cTyphimurium includes Typhimurium 5- (formerly Copenhagen) and Anatum includes Anatum var. 15+ (formerly Newington) and Anatum var. 15+, 34+.

Note: For information on the most commonly identified serotypes causing human infection in the United States see CDC (2006).



Table 3
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Cows/Bulls
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 1998	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	1	50.00	0.56
Muenchen	1	50.00	0.56
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	2		1.12
Not typed	0		
Total positive	2		1.12
Total number of analyzed samples	179		

Serotypes 1999	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	4	14.29	0.26
Muenster	4	14.29	0.26
Montevideo	3	10.71	0.20
Typhimurium	3	10.71	0.20
Typhimurium (var. Copenhagen)	2	7.14	0.13
Anatum	1	3.57	0.07
Berta	1	3.57	0.07
Derby	1	3.57	0.07
Give	1	3.57	0.07
Litchfield	1	3.57	0.07
London	1	3.57	0.07
Mbandaka	1	3.57	0.07
Meleagridis	1	3.57	0.07
Newport	1	3.57	0.07
^a Other serotypes	0		
^b Unidentified isolates	3	10.71	0.20
Total serotyped isolates	28		1.84
Not typed	5		0.33
Total positive	33		2.17
Total number of analyzed samples	1,521		



Table 3—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Cows/Bulls
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2000	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Newport	6	15.00	0.30
Muenster	5	12.50	0.25
Montevideo	4	10.00	0.20
Typhimurium	4	10.00	0.20
Kentucky	3	7.50	0.15
Meleagridis	3	7.50	0.15
Typhimurium (var. Copenhagen)	3	7.50	0.15
Albany	1	2.50	0.05
Cerro	1	2.50	0.05
Derby	1	2.50	0.05
Dublin	1	2.50	0.05
Fresno	1	2.50	0.05
Infantis	1	2.50	0.05
London	1	2.50	0.05
Mbandaka	1	2.50	0.05
Muenchen	1	2.50	0.05
Reading	1	2.50	0.05
Schwarzengrund	1	2.50	0.05
^a Other serotypes	0		
^b Unidentified isolates	1	2.50	0.05
Total serotyped isolates	40		2.01
Not typed	3		0.15
Total positive	43		2.16
Total number of analyzed samples		1,995	



Table 3—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Cows/Bulls
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2001	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	7	13.46	0.32
Anatum	5	9.62	0.23
Kentucky	5	9.62	0.23
Typhimurium	4	7.69	0.18
Dublin	3	5.77	0.14
Newport	3	5.77	0.14
Albany	2	3.85	0.09
Heidelberg	2	3.85	0.09
Mbandaka	2	3.85	0.09
Meleagridis	2	3.85	0.09
Newbrunswick	2	3.85	0.09
Reading	2	3.85	0.09
Typhimurium (var. Copenhagen)	2	3.85	0.09
^a Other serotypes	10	19.23	0.46
^b Unidentified isolates	1	1.92	0.05
Total serotyped isolates	52		2.39
Not typed	1		0.05
Total positive	53		2.44
Total number of analyzed samples			
		2,176	

Serotypes 2002	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Newport	18	24.66	0.41
Muenster	8	10.96	0.18
Agona	5	6.85	0.11
Kentucky	5	6.85	0.11
Typhimurium	5	6.85	0.11
Infantis	4	5.48	0.09
Montevideo	4	5.48	0.09
Derby	3	4.11	0.07
Mbandaka	3	4.11	0.07
Reading	3	4.11	0.07
^a Other serotypes	14	19.18	0.32
^b Unidentified isolates	1	1.37	0.02
Total serotyped isolates	73		1.65
Not typed	0		
Total positive	73		1.65
Total number of analyzed samples			
		4,414	



Table 3—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Cows/Bulls
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2003	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Muenster	7	18.42	0.27
Newport	5	13.16	0.19
Typhimurium (var. Copenhagen)	5	13.16	0.19
Typhimurium	3	7.89	0.12
Cerro	3	7.89	0.12
Agona	2	5.26	0.08
Derby	2	5.26	0.08
Give	2	5.26	0.08
Meleagridis	2	5.26	0.08
Anatum	1	2.63	0.04
Cubana	1	2.63	0.04
Havana	1	2.63	0.04
Infantis	1	2.63	0.04
Montevideo	1	2.63	0.04
Newbrunswick	1	2.63	0.04
Soerenga	1	2.63	0.04
^a Other serotypes	6	15.79	0.23
^b Unidentified isolates	0		
Total serotyped isolates	38		1.46
Not typed	0		
Total positive	38		1.46
<hr/>			
Total number of analyzed samples		2,599	



Table 3—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Cows/Bulls
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2004	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Cerro	2	8.33	0.06
Derby	2	8.33	0.06
Dublin	2	8.33	0.06
Muenster	2	8.33	0.06
Newport	2	8.33	0.06
Typhimurium	2	8.33	0.06
Agona	1	4.17	0.03
Anatum	1	4.17	0.03
Brandenburg	1	4.17	0.03
Infantis	1	4.17	0.03
Johannesburg	1	4.17	0.03
Livingston	1	4.17	0.03
London	1	4.17	0.03
Meleagridis	1	4.17	0.03
Montevideo	1	4.17	0.03
Muenchen	1	4.17	0.03
Typhimurium (var. Copenhagen)	1	4.17	0.03
^a Other serotypes	0		
^b Unidentified isolates	1	4.17	0.03
Total serotyped isolates	24		0.76
Not typed	0		
Total positive	24		0.76
Total number of analyzed samples		3,175	



Table 3—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Cows/Bulls
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2005	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	3	11.54	0.15
Agona	2	7.69	0.10
Anatum	2	7.69	0.10
Cerro	2	7.69	0.10
Infantis	2	7.69	0.10
Kentucky	2	7.69	0.10
Muenster	2	7.69	0.10
Typhimurium (var. Copenhagen)	2	7.69	0.10
Bareilly	1	3.85	0.05
Bovismorbificans	1	3.85	0.05
Derby	1	3.85	0.05
Dublin	1	3.85	0.05
Hadar	1	3.85	0.05
Meleagridis	1	3.85	0.05
Newport	1	3.85	0.05
Panama	1	3.85	0.05
Typhimurium	1	3.85	0.05
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	26		1.33
Not typed	0		
Total positive	26		1.33
Total number of analyzed samples			
		1,949	



Table 3—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Cows/Bulls
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2005 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	3	11.54	0.15
^c Typhimurium	3	11.54	0.15
Agona	2	7.69	0.10
Anatum	2	7.69	0.10
Cerro	2	7.69	0.10
Infantis	2	7.69	0.10
Kentucky	2	7.69	0.10
Muenster	2	7.69	0.10
Bareilly	1	3.85	0.05
Bovismorbificans	1	3.85	0.05
Derby	1	3.85	0.05
Dublin	1	3.85	0.05
Hadar	1	3.85	0.05
Meleagridis	1	3.85	0.05
Newport	1	3.85	0.05
Panama	1	3.85	0.05
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	26		1.33
Not typed	0		
Total positive	26		1.33
Total number of analyzed samples			
		1,949	



Table 3 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Cows/Bulls
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2006	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	4	21.05	0.18
Montevideo	3	15.79	0.13
Agona	2	10.53	0.09
Muenster	2	10.53	0.09
Cerro	1	5.26	0.04
Dublin	1	5.26	0.04
Enteritidis	1	5.26	0.04
Heidelberg	1	5.26	0.04
Mbandaka	1	5.26	0.04
Meleagridis	1	5.26	0.04
Muenchen	1	5.26	0.04
Newport	1	5.26	0.04
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	19		0.85
Not typed	0		
Total positive	19		0.85
Total number of analyzed samples			
		2,246	



Table 3 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Cows/Bulls
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2007	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Anatum	7	16.67	0.18
Newport	7	16.67	0.18
Cerro	5	11.90	0.13
Montevideo	4	9.52	0.10
Muenster	4	9.52	0.10
Infantis	2	4.76	0.05
^c 3.10:e,h:-	1	2.38	0.03
^c 6,7:z10:-	1	2.38	0.03
Enteritidis	1	2.38	0.03
Gaminara	1	2.38	0.03
Kentucky	1	2.38	0.03
Mbandaka	1	2.38	0.03
Meleagridis	1	2.38	0.03
Miami	1	2.38	0.03
Muenchen	1	2.38	0.03
Saintpaul	1	2.38	0.03
Typhimurium (var. Copenhagen)	1	2.38	0.03
Typhimurium	1	2.38	0.03
^a Other serotypes	0		
^b Unidentified isolates	1	2.38	0.03
Total serotyped isolates	42		1.07
Not typed	0		
Total positive	42		1.07
Total number of analyzed samples			
		3,918	



Table 3 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Cows/Bulls
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2007 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Anatum	7	16.67	0.18
Newport	7	16.67	0.18
Cerro	5	11.90	0.13
Montevideo	4	9.52	0.10
Muenster	4	9.52	0.10
Infantis	2	4.76	0.05
^d Typhimurium	2	4.76	0.05
^c 3.10:e,h:-	1	2.38	0.03
^c 6,7:z10:-	1	2.38	0.03
Enteritidis	1	2.38	0.03
Gaminara	1	2.38	0.03
Kentucky	1	2.38	0.03
Mbandaka	1	2.38	0.03
Meleagridis	1	2.38	0.03
Miami	1	2.38	0.03
Muenchen	1	2.38	0.03
Saintpaul	1	2.38	0.03
^a Other serotypes	0		
^b Unidentified isolates	1	2.38	0.03
Total serotyped isolates	42		1.07
Not typed	0		
Total positive	42		1.07
Total number of analyzed samples		3,918	



Table 3 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Cows/Bulls
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2008	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Agona	2	16.67	0.09
Cerro	2	16.67	0.09
Montevideo	2	16.67	0.09
Anatum var. 15+	1	8.33	0.04
Hadar	1	8.33	0.04
Kentucky	1	8.33	0.04
London	1	8.33	0.04
Muenster	1	8.33	0.04
Newport	1	8.33	0.04
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	12		0.52
Not typed	0		
*Total positive	12		0.52
Total number of analyzed samples			
		2,301	

Serotypes 2009	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	3	25.00	0.15
Give	2	16.67	0.10
Newport	2	16.67	0.10
^c 6,7:k:-	1	8.33	0.05
Agona	1	8.33	0.05
Kentucky	1	8.33	0.05
Mbandaka	1	8.33	0.05
Uganda	1	8.33	0.05
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	12		0.59
Not typed	0		
*Total positive	12		0.59
Total number of analyzed samples			
		2,036	



Table 3 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Cows/Bulls
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2010	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	4	44.44	0.23
Bredeney	1	11.11	0.06
Hadar	1	11.11	0.06
Meleagridis	1	11.11	0.06
Senftenber	1	11.11	0.06
Typhimurium 5-	1	11.11	0.06
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	9		0.51
Not typed	0		
*Total positive	9		0.51
Total number of analyzed samples	1,764		

*The percentages listed for total positive isolates may not equal the sum of data in the Percent of Analyzed Samples column due to rounding.

^a The ten most commonly isolated serotypes during a listed year are identified by name while less commonly identified serotypes are included in the “other serotypes” category. When there is more than one serotype in tenth place, all serotypes in tenth place are listed.

^bThe “unidentified” designation includes isolates for which a single specific serotype could not be determined including those that were solely named through antigenic formulas.

^cPrior to 2004, isolates fitting the designation in b were included in the “unidentified isolates” category.

^dTyphimurium includes Typhimurium 5- (formerly Copenhagen).

Note: For information on the most commonly identified serotypes causing human infection in the United States see CDC (2006).



Table 4
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Steers/Heifers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 1998	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Total positive	0		
Total number of analyzed samples	214		

Serotypes 1999	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Heidelberg	1	50.00	0.13
Panama	1	50.00	0.13
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	2		0.26
Not typed	0		
Total positive	2		0.26
Total number of analyzed samples	782		

Serotypes 2000	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	2	50.00	0.18
Minnesota	1	25.00	0.09
Typhimurium (var. Copenhagen)	1	25.00	0.09
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	4		0.37
Not typed	0		
Total positive	4		0.37
Total number of analyzed samples	1,092		



Table 4—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Steers/Heifers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2001	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	4	36.36	0.24
Dublin	2	18.18	0.12
Cerro	1	9.09	0.06
Heidelberg	1	9.09	0.06
Kentucky	1	9.09	0.06
Montevideo	1	9.09	0.06
Saintpaul	1	9.09	0.06
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	11		0.65
Not typed	0		
Total positive	11		0.65
Total number of analyzed samples			
		1,695	

Serotypes 2002	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Reading	3	21.43	0.07
Agona	2	14.29	0.04
Kentucky	2	14.29	0.04
Braenderup	1	7.14	0.02
Derby	1	7.14	0.02
Heidelberg	1	7.14	0.02
Montevideo	1	7.14	0.02
Muenster	1	7.14	0.02
Sandiego	1	7.14	0.02
^a Other serotypes	0		
^b Unidentified isolates	1	7.14	0.02
Total serotyped isolates	14		0.31
Not typed	0		
Total positive	14		0.31
Total number of analyzed samples			
		4,572	



Table 4—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Steers/Heifers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2003	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	3	15.79	0.07
Kentucky	2	10.53	0.04
Montevideo	2	10.53	0.04
Anatum	2	10.53	0.04
Oranienburg	2	10.53	0.04
Heidelberg	1	5.26	0.02
Bovismorbificans	1	5.26	0.02
Dublin	1	5.26	0.02
Mbandaka	1	5.26	0.02
Muenchen	1	5.26	0.02
Newport	1	5.26	0.02
Ohio	1	5.26	0.02
Uganda	1	5.26	0.02
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	19		0.42
Not typed	0		
Total positive	19		0.42
Total number of analyzed samples		4,480	



Table 4—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Steers/Heifers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2004	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Derby	4	33.33	0.09
^c 6,8:-:1,2	1	8.33	0.02
Anatum	1	8.33	0.02
Dublin	1	8.33	0.02
Indiana	1	8.33	0.02
Infantis	1	8.33	0.02
Newport	1	8.33	0.02
Senftenberg	1	8.33	0.02
Typhimurium	1	8.33	0.02
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	12		0.28
Not typed	0		
Total positive	12		0.28
Total number of analyzed samples			
		4,227	

Serotypes 2005	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Dublin	2	16.67	0.10
Muenchen	2	16.67	0.10
Paratyphi B var. L-tartrate+	2	16.67	0.10
Poona	2	16.67	0.10
Gaminara	1	8.33	0.05
Havana	1	8.33	0.05
Muenster	1	8.33	0.05
Newport	1	8.33	0.05
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	12		0.57
Not typed	0		
Total positive	12		0.57
Total number of analyzed samples			
		2,090	



Table 4 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Steers/Heifers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2006	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Newport	2	20.00	0.05
Adelaide	1	10.00	0.03
Anatum var. 15+,34+	1	10.00	0.03
Bere	1	10.00	0.03
Montevideo	1	10.00	0.03
Muenster	1	10.00	0.03
Reading	1	10.00	0.03
Saintpaul	1	10.00	0.03
Typhimurium	1	10.00	0.03
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	10		0.27
Not typed	0		
Total positive	10		0.27
Total number of analyzed samples			
		3,674	

Serotypes 2007	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Dublin	2	22.22	0.05
Anatum	1	11.11	0.02
Give var. 15+	1	11.11	0.02
Infantis	1	11.11	0.02
Kentucky	1	11.11	0.02
Montevideo	1	11.11	0.02
Newport	1	11.11	0.02
^a Other serotypes	0	11.11	0.02
^b Unidentified isolates	1	11.11	0.02
Total serotyped isolates	9		0.20
Not typed	0		
Total positive	9		0.20
Total number of analyzed samples			
		4,406	



Table 4 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Steers/Heifers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2008	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Dublin	2	22.22	0.04
Anatum	1	11.11	0.02
Mbandaka	1	11.11	0.02
Montevideo	1	11.11	0.02
Newport	1	11.11	0.02
Typhimurium	1	11.11	0.02
Typhimurium (var. Copenhagen)	1	11.11	0.02
^a Other serotypes	0		
^b Unidentified isolates	1	11.11	0.02
Total serotyped isolates	9		0.18
Not typed	0		
Total positive	9		0.18
Total number of analyzed samples	4,965		

Serotypes 2008 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Dublin	2	22.22	0.04
^d Typhimurium	2	22.22	0.04
Anatum	1	11.11	0.02
Mbandaka	1	11.11	0.02
Montevideo	1	11.11	0.02
Newport	1	11.11	0.02
^a Other serotypes	0		
^b Unidentified isolates	1	11.11	0.02
Total serotyped isolates	9		0.18
Not typed	0		
Total positive	9		0.18
Total number of analyzed samples	4,965		



Table 4 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Steers/Heifers
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2009	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Bareilly	1	10.00	0.02
Give	1	10.00	0.02
^c III_61:-:1,5,7	1	10.00	0.02
Montevideo	1	10.00	0.02
Muenchen	1	10.00	0.02
Muenster	1	10.00	0.02
Poona	1	10.00	0.02
Typhimurium	1	10.00	0.02
^a Other serotypes	0		
^b Unidentified isolates	2	20.00	0.04
Total serotyped isolates	10		0.20
Not typed	0		
Total positive	10		0.20
Total number of analyzed samples	4,939		

Serotypes 2010	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Anatum	3	50.00	0.06
Adelaide	1	16.67	0.02
Derby	1	16.67	0.02
Montevideo	1	16.67	0.02
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	6		0.12
Not typed	0		
Total positive	6		0.12
Total number of analyzed samples	4,918		

^aThe ten most commonly isolated serotypes during a listed year are identified by name while less commonly identified serotypes are included in the “other serotypes” category. When there is more than one serotype in tenth place, all serotypes in tenth place are listed.

^bThe “unidentified” designation includes isolates for which a single specific serotype could not be determined including those that were solely named through antigenic formulas.

^cPrior to 2004, isolates fitting the designation in b were included in the “unidentified isolates” category.

^dTyphimurium includes Typhimurium 5- (formerly Copenhagen).

Note: For information on the most commonly identified serotypes causing human infection in the United States see CDC (2006).



Table 5
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Beef
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 1998	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Anatum	13	18.06	1.00
Montevideo	9	12.50	0.69
Meleagridis	7	9.72	0.54
Muenster	7	9.72	0.54
Hadar	4	5.56	0.31
Typhimurium (var. Copenhagen)	4	5.56	0.31
Infantis	3	4.17	0.23
Kentucky	3	4.17	0.23
Newport	3	4.17	0.23
Reading	3	4.17	0.23
^a Other serotypes	15	20.83	1.16
^b Unidentified isolates	1	1.39	0.08
Total serotyped isolates	72		5.56
Not typed	11		0.85
Total positive	83		6.40
Total number of analyzed samples			
		1,296	

Serotypes 1999	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	148	22.77	0.90
Anatum	70	10.77	0.43
Muenster	46	7.08	0.28
Typhimurium	36	5.54	0.22
Cerro	32	4.92	0.20
Kentucky	31	4.77	0.19
Mbandaka	28	4.31	0.17
Typhimurium (var. Copenhagen)	28	4.31	0.17
Meleagridis	23	3.54	0.14
Newport	21	3.23	0.13
^a Other serotypes	180	27.69	1.10
^b Unidentified isolates	7	1.08	0.04
Total serotyped isolates	650		3.97
Not typed	60		0.37
Total positive	710		4.34
Total number of analyzed samples			
		16,375	



Table 5—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Beef
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2000	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	131	12.72	0.40
Senftenberg	102	9.90	0.31
Newport	85	8.25	0.26
Typhimurium var. Copenhagen)	80	7.77	0.24
Anatum	70	6.80	0.21
Typhimurium	65	6.31	0.20
Cerro	52	5.05	0.16
Muenster	46	4.47	0.14
Mbandaka	45	4.37	0.14
Kentucky	44	4.27	0.13
^a Other serotypes	287	27.86	0.87
^b Unidentified isolates	23	2.23	0.07
Total serotyped isolates	1030		3.14
Not typed	50		0.15
Total positive	1080		3.29
Total number of analyzed samples			
		32,844	

Serotypes 2001	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	94	14.05	0.39
Newport	73	10.91	0.30
Anatum	62	9.27	0.26
Muenster	52	7.77	0.21
Kentucky	46	6.88	0.19
Typhimurium	37	5.53	0.15
Mbandaka	36	5.38	0.15
Cerro	26	3.89	0.11
Typhimurium (var. Copenhagen)	25	3.74	0.10
Reading	17	2.54	0.07
^a Other serotypes	185	27.65	0.76
^b Unidentified isolates	16	2.39	0.07
Total serotyped isolates	669		2.76
Not typed	17		0.07
Total positive	686		2.83
Total number of analyzed samples			
		24,243	



Table 5—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Beef
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2002	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	89	11.32	0.29
Newport	84	10.69	0.27
Anatum	77	9.80	0.25
Muenster	65	8.27	0.21
Agona	52	6.62	0.17
Typhimurium (var. Copenhagen)	51	6.49	0.16
Kentucky	38	4.83	0.12
Mbandaka	36	4.58	0.12
Typhimurium	32	4.07	0.10
Cerro	30	3.82	0.10
^a Other serotypes	221	28.12	0.71
^b Unidentified isolates	11	1.40	0.04
Total serotyped isolates	786		2.54
Not typed	4		0.01
Total positive	790		2.55
Total number of analyzed samples			
		30,933	

Serotypes 2003	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Newport	54	11.02	0.19
Montevideo	49	10.00	0.17
Anatum	45	9.18	0.15
Agona	29	5.92	0.10
Typhimurium (var. Copenhagen)	27	5.51	0.09
Typhimurium	27	5.51	0.09
Dublin	26	5.31	0.09
Muenster	24	4.90	0.08
Kentucky	23	4.69	0.08
Mbandaka	22	4.49	0.08
^a Other serotypes	154	31.43	0.53
^b Unidentified isolates	10	2.04	0.03
Total serotyped isolates	490		1.68
Not typed	0		
Total positive	490		1.68
Total number of analyzed samples			
		29,097	



Table 5—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Beef
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2004	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	71	14.06	0.23
Anatum	55	10.89	0.18
Muenster	47	9.31	0.15
Newport	38	7.52	0.12
Agona	36	7.13	0.12
Dublin	25	4.95	0.08
Kentucky	21	4.16	0.07
Typhimurium	21	4.16	0.07
Typhimurium (var. Copenhagen)	18	3.56	0.06
Mbandaka	17	3.37	0.05
^a Other serotypes	154	30.50	0.50
^b Unidentified isolates	2	0.40	0.01
Total serotyped isolates	505		1.63
Not typed	0		
Total positive	505		1.63
Total number of analyzed samples			
		30,984	

Serotypes 2005	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	30	13.89	0.15
Anatum	18	8.33	0.09
Muenster	17	7.87	0.09
Newport	14	6.48	0.07
Mbandaka	12	5.56	0.06
Typhimurium (var. Copenhagen)	11	5.09	0.06
Dublin	9	4.17	0.05
Reading	9	4.17	0.05
Typhimurium	9	4.17	0.05
Cerro	8	3.70	0.04
^a Other serotypes	76	35.19	0.39
^b Unidentified isolates	3	1.39	0.02
Total serotyped isolates	216		1.12
Not typed	1		0.01
Total positive	217		1.12
Total number of analyzed samples			
		19,365	



Table 5—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Beef
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2005 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	30	13.89	0.15
^c Typhimurium	20	9.26	0.10
^c Anatum	20	9.26	0.10
Muenster	17	7.87	0.09
Newport	14	6.48	0.07
Mbandaka	12	5.56	0.06
Dublin	9	4.17	0.05
Reading	9	4.17	0.05
Cerro	8	3.70	0.04
Agona	7	3.24	0.04
Give	7	3.24	0.04
Meleagridis	7	3.24	0.04
^a Other serotypes	53	24.54	0.27
^b Unidentified isolates	3	1.39	0.02
Total serotyped isolates	216		1.12
Not typed	1		0.01
Total positive	217		1.12
Total number of analyzed samples	19,365		



Table 5 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Beef
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2006	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	59	16.86	0.33
Muenster	34	9.71	0.19
Anatum	24	6.86	0.13
Newport	24	6.86	0.13
Cerro	22	6.29	0.12
Dublin	18	5.14	0.10
Reading	18	5.14	0.10
Mbandaka	14	4.00	0.08
Typhimurium	14	4.00	0.08
Infantis	13	3.71	0.07
^a Other serotypes	109	31.14	0.61
^b Unidentified	1	0.29	0.01
Total serotyped isolates	350		1.96
Not typed	0		
Total positive	350		1.96
Total number of analyzed samples	17,849		

Serotypes 2006 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	59	16.86	0.33
Muenster	34	9.71	0.19
^c Anatum	27	7.71	0.15
Newport	24	6.86	0.13
Cerro	22	6.29	0.12
^c Typhimurium	21	6.00	0.12
Dublin	18	5.14	0.10
Reading	18	5.14	0.10
Mbandaka	14	4.00	0.08
Infantis	13	3.71	0.07
^a Other serotypes	99	28.29	0.55
^b Unidentified	1	0.29	0.01
Total serotyped isolates	350		1.96
Not typed	0		
Total positive	350		1.96
Total number of analyzed samples	17,849		



Table 5 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Beef
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2007	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	86	23.43	0.63
Dublin	36	9.81	0.26
Muenster	28	7.63	0.20
Mbandaka	23	6.27	0.17
Newport	22	5.99	0.16
Cerro	18	4.90	0.13
Meleagridis	16	4.36	0.12
Agona	15	4.09	0.11
Anatum	14	3.81	0.10
Infantis	10	2.72	0.07
Kentucky	10	2.72	0.07
Typhimurium	10	2.72	0.07
^a Other serotypes	74	20.16	0.54
^b Unidentified	5	1.36	0.04
Total serotyped isolates	367		2.68
Not typed	0		
Total positive	367		2.68
Total number of analyzed samples			
		13,695	



Table 5 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Beef
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2007 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	86	23.43	0.63
Dublin	36	9.81	0.26
Muenster	28	7.63	0.20
Mbandaka	23	6.27	0.17
Newport	22	5.99	0.16
^c Typhimurium	19	5.18	0.14
Cerro	18	4.90	0.13
Meleagridis	16	4.36	0.12
Agona	15	4.09	0.11
Anatum	14	3.81	0.10
Infantis	10	2.72	0.07
Kentucky	10	2.72	0.07
^a Other serotypes	65	17.71	0.47
^b Unidentified	5	1.36	0.04
Total serotyped isolates	367		2.68
Not typed	0		
Total positive	367		2.68
Total number of analyzed samples		13,695	



Table 5 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Beef
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2008	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	100	24.51	0.60
Dublin	50	12.25	0.30
Newport	30	7.35	0.18
Anatum	25	6.13	0.15
Typhimurium	23	5.64	0.14
Cerro	21	5.15	0.13
Kentucky	18	4.41	0.11
Mbandaka	17	4.17	0.10
Meleagridis	16	3.92	0.10
Muenster	16	3.92	0.10
^a Other serotypes	90	22.06	0.54
^b Unidentified	2	0.49	0.01
Total serotyped isolates	408		2.43
Not typed	0		
Total positive	408		2.43
Total number of analyzed samples			
		16,765	

Serotypes 2008 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	100	24.51	0.60
Dublin	50	12.25	0.30
^c Anatum	31	7.60	0.18
Newport	30	7.35	0.18
Typhimurium	27	6.62	0.16
Cerro	21	5.15	0.13
Kentucky	18	4.41	0.11
Mbandaka	17	4.17	0.10
^c Meleagridis	17	4.17	0.10
Muenster	16	3.92	0.10
^a Other serotypes	79	19.36	0.47
^b Unidentified	2	0.49	0.01
Total serotyped isolates	408		2.43
Not typed	0		
*Total positive	408		2.43
Total number of analyzed samples			
		16,765	



Table 5 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Beef
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2009	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	51	31.10	0.60
Dublin	21	12.80	0.25
Newport	15	9.15	0.18
Kentucky	8	4.88	0.09
Typhimurium	8	4.88	0.09
Cerro	8	4.88	0.09
Meleagridis	8	4.88	0.09
Typhimurium 5-	6	3.66	0.07
Anatum	5	3.05	0.06
Muenchen	5	3.05	0.06
^a Other serotypes	25	15.24	0.29
^b Unidentified	4	2.44	0.05
Total serotyped isolates	164		1.92
Not typed	0		
Total positive	164		1.92
Total number of analyzed samples			
		8,541	

Serotypes 2009 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	51	31.10	0.60
Dublin	21	12.80	0.25
Newport	15	9.15	0.18
^c Typhimurium	14	8.54	0.16
Cerro	8	4.88	0.09
Kentucky	8	4.88	0.09
Meleagridis	8	4.88	0.09
Anatum	5	3.05	0.06
Muenchen	5	3.05	0.06
^a Other serotypes	19	11.59	0.22
^b Unidentified	4	2.44	0.05
Total serotyped isolates	164		1.92
Not typed	0		
*Total positive	164		1.92
Total number of analyzed samples			
		8,541	



Table 5 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Beef
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2010	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	52	25.62	0.56
Dublin	38	18.72	0.41
Anatum	9	4.43	0.10
Cerro	9	4.43	0.10
Kentucky	9	4.43	0.10
Agona	7	3.45	0.08
Typhimurium	7	3.45	0.08
Mbandaka	6	2.96	0.06
Meleagridis	5	2.46	0.05
Newport	5	2.46	0.05
Typhimurium 5-	5	2.46	0.05
^a Other serotypes	44	21.67	0.48
^b Unidentified	6	2.96	0.06
Total serotyped isolates	202		2.18
Not typed	1	0.49	0.01
Total positive	203		2.19
Total number of analyzed samples			
		9,257	



Table 5 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Beef
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2010 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Montevideo	52	25.62	0.56
Dublin	38	18.72	0.41
^c Typhimurium	12	5.91	0.13
^c Anatum	11	5.42	0.12
Cerro	9	4.43	0.10
Kentucky	9	4.43	0.10
Agona	7	3.45	0.08
Mbandaka	6	2.96	0.06
Meleagridis	5	2.46	0.05
Newport	5	2.46	0.05
^a Other serotypes	42	20.69	0.45
^b Unidentified	6	2.96	0.06
Total serotyped isolates	202		2.18
Not typed	1	0.49	0.01
*Total positive	203		2.19
Total number of analyzed samples			
			9,257

*The percentages listed for total positive isolates may not equal the sum of data in the Percent of Analyzed Samples column due to rounding.

^a The ten most commonly isolated serotypes during a listed year are identified by name while less commonly identified serotypes are included in the “other serotypes” category. When there is more than one serotype in tenth place, all serotypes in tenth place are listed.

^bThe “unidentified” designation includes isolates for which a single specific serotype could not be determined including those that were solely named through antigenic formulas.

^cTyphimurium includes Typhimurium 5- (formerly Copenhagen), Anatum includes Anatum var. 15+ (formerly Newington) and Anatum var. 15+,34+. Meleagridis includes Meleagridis var. 15+.

Note: For information on the most commonly identified serotypes causing human infection in the United States see CDC (2006).



Table 6
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 1998	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Thompson	1	100.00	4.17
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	1		4.17
Not typed	0		
Total positive	1		4.17
Total number of analyzed samples	24		

Serotypes 1999	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	12	27.27	4.04
Heidelberg	7	15.91	2.36
Typhimurium (var. Copenhagen)	6	13.64	2.02
Typhimurium	5	11.36	1.68
Istanbul	2	4.55	0.67
Reading	2	4.55	0.67
Enteritidis	1	2.27	0.34
Infantis	1	2.27	0.34
Litchfield	1	2.27	0.34
Newington	1	2.27	0.34
Schwarzengrund	1	2.27	0.34
Thompson	1	2.27	0.34
^a Other serotypes	0		
^b Unidentified isolates	4	9.09	1.35
Total serotyped isolates	44		14.81
Not typed	4		1.35
Total positive	48		16.16
Total number of analyzed samples	297		



Table 6—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2000	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	13	26.53	3.14
Heidelberg	9	18.37	2.17
Typhimurium (var. Copenhagen)	6	12.24	1.45
Hadar	3	6.12	0.72
Typhimurium	3	6.12	0.72
Infantis	2	4.08	0.48
Newport	2	4.08	0.48
Thompson	2	4.08	0.48
Berta	1	2.04	0.24
Enteritidis	1	2.04	0.24
Reading	1	2.04	0.24
Schwarzengrund	1	2.04	0.24
^a Other serotypes	0		
^b Unidentified isolates	5	10.20	1.21
Total serotyped isolates	49		11.84
Not typed	8		1.93
Total positive	57		13.77
Total number of analyzed samples			
		414	

Serotypes 2001	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Heidelberg	13	26.00	4.96
Schwarzengrund	10	20.00	3.82
Kentucky	9	18.00	3.44
Typhimurium	5	10.00	1.91
Hadar	2	4.00	0.76
Thompson	2	4.00	0.76
Brandenburg	1	2.00	0.38
Johannesburg	1	2.00	0.38
Ohio	1	2.00	0.38
Typhimurium (var. Copenhagen)	1	2.00	0.38
^a Other serotypes	0		
^b Unidentified isolates	5	10.00	1.91
Total serotyped isolates	50		19.08
Not typed	1		0.38
Total positive	51		19.47
Total number of analyzed samples			
		262	



Table 6—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2002	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Heidelberg	37	29.60	8.62
Kentucky	20	16.00	4.66
Typhimurium (var. Copenhagen)	12	9.60	2.80
Typhimurium	10	8.00	2.33
Enteritidis	6	4.80	1.40
Montevideo	6	4.80	1.40
Hadar	4	3.20	0.93
Schwarzengrund	4	3.20	0.93
Infantis	3	2.40	0.70
Thompson	3	2.40	0.70
^a Other serotypes	9	7.20	2.10
^b Unidentified isolates	11	8.80	2.56
Total serotyped isolates	125		29.14
Not typed	0		
Total positive	125		29.14
Total number of analyzed samples			
		429	

Serotypes 2003	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	29	27.62	9.80
Heidelberg	27	25.71	9.12
Kentucky	21	20.00	7.09
Thompson	6	5.71	2.03
Infantis	4	3.81	1.35
Montevideo	2	1.90	0.68
Istanbul	2	1.90	0.68
Haardt	2	1.90	0.68
Oranienburg	2	1.90	0.68
Typhimurium (var. Copenhagen)	1	0.95	0.34
Typhimurium	1	0.95	0.34
Arizona	1	0.95	0.34
Bredeney	1	0.95	0.34
Mbandaka	1	0.95	0.34
Taksony	1	0.95	0.34
^a Other serotypes	0		
^b Unidentified isolates	4	3.81	1.35
Total serotyped isolates	105		35.47
Not typed	0		
Total positive	105		35.47
Total number of analyzed samples			
		296	



Table 6—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2004	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	50	50.51	12.89
Enteritidis	7	7.07	1.80
Typhimurium	7	7.07	1.80
Heidelberg	6	6.06	1.55
Montevideo	5	5.05	1.29
Schwarzengrund	5	5.05	1.29
Thompson	4	4.04	1.03
Infantis	2	2.02	0.52
^c 4,12:i:-	1	1.01	0.26
^c 14,5,12:i:-	1	1.01	0.26
^c 4,5,12:r:-	1	1.01	0.26
^c 6,7:k:-	1	1.01	0.26
Agona	1	1.01	0.26
Braenderup	1	1.01	0.26
Hadar	1	1.01	0.26
Havana	1	1.01	0.26
Mbandaka	1	1.01	0.26
Oranienburg	1	1.01	0.26
Senftenberg	1	1.01	0.26
Typhimurium (var. Copenhagen)	1	1.01	0.26
Uganda	1	1.01	0.26
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	99		25.52
Not typed	0		
Total positive	99		25.52
Total number of analyzed samples			
		388	



Table 6—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2005	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Enteritidis	15	31.91	10.34
Kentucky	15	31.91	10.34
Heidelberg	6	12.77	4.14
Typhimurium (var. Copenhagen)	3	6.38	2.07
^c 4,5,12:i:-	1	2.13	0.69
Alachua	1	2.13	0.69
Hadar	1	2.13	0.69
Kiambu	1	2.13	0.69
Muenster	1	2.13	0.69
Schwarzengrund	1	2.13	0.69
Senftenberg	1	2.13	0.69
Thompson	1	2.13	0.69
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	47		32.41
Not typed	0		
Total positive	47		32.41
Total number of analyzed samples	145		



Table 6—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2005 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Enteritidis	15	31.91	10.34
Kentucky	15	31.91	10.34
Heidelberg	6	12.77	4.14
^d Typhimurium	3	6.38	2.07
^c 4,5,12:i:-	1	2.13	0.69
Alachua	1	2.13	0.69
Hadar	1	2.13	0.69
Kiambu	1	2.13	0.69
Muenster	1	2.13	0.69
Schwarzengrund	1	2.13	0.69
Senftenberg	1	2.13	0.69
Thompson	1	2.13	0.69
^a Other serotypes	0		
^b Unidentified isolates	0		
Total serotyped isolates	47		32.41
Not typed	0		
Total positive	47		32.41
Total number of analyzed samples	145		



Table 6 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2006	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	42	42.00	18.92
Heidelberg	16	16.00	7.21
Enteritidis	16	16.00	7.21
^c 4,5,12:i:-	4	4.00	1.80
Berta	3	3.00	1.35
Infantis	3	3.00	1.35
Schwarzengrund	3	3.00	1.35
Typhimurium	2	2.00	0.90
Typhimurium (var. Copenhagen)	2	2.00	0.90
^c 8,(20):z6	1	1.00	0.45
Anatum	1	1.00	0.45
Hadar	1	1.00	0.45
Mbandaka	1	1.00	0.45
Montevideo	1	1.00	0.45
Thompson	1	1.00	0.45
^a Other serotypes	2	2.00	0.90
^b Unidentified	3	3.00	1.35
Total serotyped isolates	100		45.05
Not typed	0		
Total positive	100		45.05
Total number of analyzed samples	222		



Table 6 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2006 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	42	42.00	18.92
Heidelberg	16	16.00	7.21
Enteritidis	16	16.00	7.21
^c 4,5,12:i:-	4	4.00	1.80
^d Typhimurium	4	4.00	1.80
Berta	3	3.00	1.35
Infantis	3	3.00	1.35
Schwarzengrund	3	3.00	1.35
^c 8,(20):z6	1	1.00	0.45
Anatum	1	1.00	0.45
Hadar	1	1.00	0.45
Mbandaka	1	1.00	0.45
Montevideo	1	1.00	0.45
Thompson	1	1.00	0.45
^a Other serotypes	2	2.00	0.90
^b Unidentified	3	3.00	1.35
Total serotyped isolates	100		45.05
Not typed	0		
Total positive	100		45.05
Total number of analyzed samples		222	



Table 6 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2007	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Enteritidis	34	25.56	6.72
Kentucky	33	24.81	6.52
Heidelberg	27	20.30	5.34
^c 4,5,12:i:-	7	5.26	1.38
Typhimurium (var. Copenhagen)	5	3.76	0.99
Infantis	3	2.26	0.59
Thompson	3	2.26	0.59
Typhimurium	3	2.26	0.59
4,12:i:-	2	1.50	0.40
Minnesota	2	1.50	0.40
Schwarzengrund	2	1.50	0.40
^a Other serotypes	10	7.52	1.98
^b Unidentified	2	1.50	0.40
Total serotyped isolates	133		26.28
Not typed	0		
Total positive	133		26.28
Total number of analyzed samples			
		506	

Serotypes 2007 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Enteritidis	34	25.56	6.72
Kentucky	33	24.81	6.52
Heidelberg	27	20.30	5.34
^d Typhimurium	8	6.02	1.58
^c 4,5,12:i:-	7	5.26	1.38
Infantis	3	2.26	0.59
Thompson	3	2.26	0.59
4,12:i:-	2	1.50	0.40
Minnesota	2	1.50	0.40
Schwarzengrund	2	1.50	0.40
^a Other serotypes	10	7.52	1.98
^b Unidentified	2	1.50	0.40
Total serotyped isolates	133		26.28
Not typed	0		
Total positive	133		26.28
Total number of analyzed samples			
		506	



Table 6 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2008	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	30	28.57	7.28
Heidelberg	26	24.76	6.31
Enteritidis	21	20.00	5.10
Typhimurium	6	5.71	1.46
Typhimurium (var. Copenhagen)	6	5.71	1.46
^c 4,5,12:i:-	2	1.90	0.49
Infantis	2	1.90	0.49
Montevideo	2	1.90	0.49
^c 4,12:i:-	1	0.95	0.24
^c 4,5,12:r:-	1	0.95	0.24
^c 6,7:-:1,5	1	0.95	0.24
^c 8,20:-:z6	1	0.95	0.24
Berta	1	0.95	0.24
Blockley	1	0.95	0.24
Braenderup	1	0.95	0.24
Hartford	1	0.95	0.24
Kralingen	1	0.95	0.24
Oranienburg	1	0.95	0.24
^a Other serotypes	0		
^b Unidentified	0		
Total serotyped isolates	105		25.49
Not typed	0		
Total positive	105		25.49
Total number of analyzed samples		412	



Table 6 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2008 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	30	28.57	7.28
Heidelberg	26	24.76	6.31
Enteritidis	21	20.00	5.10
^d Typhimurium	12	11.43	2.91
^c 4,5,12:i:-	2	1.90	0.49
Infantis	2	1.90	0.49
Montevideo	2	1.90	0.49
^c 4,12:i:-	1	0.95	0.24
^c 4,5,12:r:-	1	0.95	0.24
^c 6,7:-:1,5	1	0.95	0.24
^c 8,20:-:z6	1	0.95	0.24
Berta	1	0.95	0.24
Blockley	1	0.95	0.24
Braenderup	1	0.95	0.24
Hartford	1	0.95	0.24
Kralingen	1	0.95	0.24
Oranienburg	1	0.95	0.24
^a Other serotypes	0		
^b Unidentified	0		
Total serotyped isolates	105		25.49
Not typed	0		
*Total positive	105		25.49
		412	



Table 6 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2009	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	21	30.88	5.61
Enteritidis	20	29.41	5.35
Heidelberg	7	10.29	1.87
Typhimurium 5-	5	7.35	1.34
^c 4,5,12:i:-	3	4.41	0.80
^c 8,20:-:z6	2	2.94	0.53
Braenderup	2	2.94	0.53
^c 4,12:i:-	1	1.47	0.27
^c 4,12:r:-	1	1.47	0.27
Blockley	1	1.47	0.27
Cerro	1	1.47	0.27
Infantis	1	1.47	0.27
Montevideo	1	1.47	0.27
Schwarzengrund	1	1.47	0.27
Typhimurium	1	1.47	0.27
^a Other serotypes	0		
^b Unidentified	0		
Total serotyped isolates	68		18.18
Not typed	0		
Total positive	68		18.18
Total number of analyzed samples	374		



Table 6 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2009 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	21	30.88	5.61
Enteritidis	20	29.41	5.35
Heidelberg	7	10.29	1.87
^d Typhimurium	6	7.35	1.34
^c 4,5,12:i:-	3	4.41	0.80
^c 8,20:-:z6	2	2.94	0.53
Braenderup	2	2.94	0.53
^c 4,12:i:-	1	1.47	0.27
^c 4,12:r:-	1	1.47	0.27
Blockley	1	1.47	0.27
Cerro	1	1.47	0.27
Infantis	1	1.47	0.27
Montevideo	1	1.47	0.27
Schwarzengrund	1	1.47	0.27
^a Other serotypes	0		
^b Unidentified	0		
Total serotyped isolates	68		18.18
Not typed	0		
*Total positive	68		18.18
		374	



Table 6 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2010	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	28	35.00	6.57
Enteritidis	24	30.00	5.63
Heidelberg	8	10.00	1.88
Typhimurium 5-	5	6.25	1.17
^c 4,12:i:-	3	3.75	0.70
^c 4,5,12:i:-	2	2.50	0.47
Berta	2	2.50	0.47
^c 8,20:-:z6	1	1.25	0.23
Hadar	1	1.25	0.23
Infantis	1	1.25	0.23
Montevideo	1	1.25	0.23
Newport	1	1.25	0.23
Ohio	1	1.25	0.23
Thompson	1	1.25	0.23
Typhimurium	1	1.25	0.23
^a Other serotypes	0		
^b Unidentified	0		
Total serotyped isolates	80		18.78
Not typed	0		
*Total positive	80		18.78
Total number of analyzed samples	426		



Table 6 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Chicken
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2010 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Kentucky	28	35.00	6.57
Enteritidis	24	30.00	5.63
Heidelberg	8	10.00	1.88
^d Typhimurium	6	7.50	1.41
^c 4,12:i:-	3	3.75	0.70
^c 4,5,12:i:-	2	2.50	0.47
Berta	2	2.50	0.47
^c 8,20:-:z6	1	1.25	0.23
Hadar	1	1.25	0.23
Infantis	1	1.25	0.23
Montevideo	1	1.25	0.23
Newport	1	1.25	0.23
Ohio	1	1.25	0.23
Thompson	1	1.25	0.23
^a Other serotypes	0		
^b Unidentified	0		
Total serotyped isolates	80		18.78
Not typed	0		
*Total positive	80		18.78
			426

*The percentages listed for total positive isolates may not equal the sum of data in the Percent of Analyzed Samples column due to rounding.

^a The ten most commonly isolated serotypes during a listed year are identified by name while less commonly identified serotypes are included in the “other serotypes” category. When there is more than one serotype in tenth place, all serotypes in tenth place are listed.

^bThe “unidentified” designation includes isolates for which a single specific serotype could not be determined including those that were solely named through antigenic formulas.

^cPrior to 2004, isolates fitting the designation in b were included in the “unidentified isolates” category.

^dTyphimurium includes Typhimurium 5- (formerly Copenhagen).

Note: For information on the most commonly identified serotypes causing human infection in the United States see CDC (2006).



Table 7
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Turkey
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 1998	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	36	19.15	6.09
Heidelberg	35	18.62	5.92
Senftenberg	21	11.17	3.55
Reading	17	9.04	2.88
Schwarzengrund	17	9.04	2.88
Muenster	7	3.72	1.18
Saintpaul	7	3.72	1.18
Anatum	5	2.66	0.85
Kentucky	5	2.66	0.85
Typhimurium	5	2.66	0.85
^a Other serotypes	32	17.02	5.41
^b Unidentified isolates	1	0.53	0.17
Total serotyped isolates	188		31.81
Not typed	28		4.74
Total positive	216		36.55
Total number of analyzed samples			
		591	

Serotypes 1999	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	72	22.15	6.86
Heidelberg	61	18.77	5.81
Senftenberg	27	8.31	2.57
Reading	26	8.00	2.48
Muenster	18	5.54	1.71
Agona	16	4.92	1.52
Saintpaul	13	4.00	1.24
Schwarzengrund	12	3.69	1.14
Typhimurium (var. Copenhagen)	12	3.69	1.14
Typhimurium	7	2.15	0.67
^a Other serotypes	54	16.62	5.14
^b Unidentified isolates	7	2.15	0.67
Total serotyped isolates	325		30.95
Not typed	7		0.67
Total positive	332		31.62
Total number of analyzed samples			
		1,050	



Table 7—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Turkey
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2000	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Heidelberg	80	21.33	5.16
Hadar	57	15.20	3.68
Agona	35	9.33	2.26
Senftenberg	31	8.27	2.00
Schwarzengrund	29	7.73	1.87
Reading	22	5.87	1.42
Saintpaul	18	4.80	1.16
Muenster	12	3.20	0.77
Brandenburg	10	2.67	0.64
Arizona	8	2.13	0.52
Muenchen	8	2.13	0.52
^a Other serotypes	61	16.27	3.93
^b Unidentified isolates	4	1.07	0.26
Total serotyped isolates	375		24.18
Not typed	24		1.55
Total positive	399		25.73
Total number of analyzed samples			
		1,551	

Serotypes 2001	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Heidelberg	33	24.81	6.35
Senftenberg	18	13.53	3.46
Hadar	14	10.53	2.69
Arizona	10	7.52	1.92
Reading	10	7.52	1.92
Agona	8	6.02	1.54
Newport	7	5.26	1.35
Saintpaul	5	3.76	0.96
Schwarzengrund	4	3.01	0.77
Derby	3	2.26	0.58
Typhimurium	3	2.26	0.58
Worthington	3	2.26	0.58
^a Other serotypes	15	11.28	2.88
^b Unidentified isolates	0		
Total serotyped isolates	133		25.58
Not typed	3		0.58
Total positive	136		26.15
Total number of analyzed samples			
		520	



Table 7—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Turkey
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2002	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Heidelberg	37	19.27	3.44
Reading	24	12.50	2.23
Hadar	23	11.98	2.14
Saintpaul	14	7.29	1.30
Senftenberg	14	7.29	1.30
Arizona	10	5.21	0.93
Newport	10	5.21	0.93
Schwarzengrund	9	4.69	0.84
Uganda	8	4.17	0.74
Typhimurium	5	2.60	0.47
^a Other serotypes	30	15.63	2.79
^b Unidentified isolates	8	4.17	0.74
Total serotyped isolates	192		17.86
Not typed	0		
Total positive	192		17.86
Total number of analyzed samples			
		1,075	

Serotypes 2003	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Heidelberg	55	21.57	5.48
Hadar	44	17.25	4.38
Arizona	31	12.16	3.09
Reading	28	10.98	2.79
Saintpaul	19	7.45	1.89
Newport	18	7.06	1.79
Senftenberg	11	4.31	1.10
Kentucky	9	3.53	0.90
Schwarzengrund	6	2.35	0.60
Typhimurium	5	1.96	0.50
^a Other serotypes	24	9.41	2.39
^b Unidentified isolates	5	1.96	0.50
Total serotyped isolates	255		25.40
Not typed	0		
Total positive	255		25.40
Total number of analyzed samples			
		1,004	



Table 7—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Turkey
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2004	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Heidelberg	38	18.27	3.64
Hadar	27	12.98	2.59
Reading	16	7.69	1.53
Derby	15	7.21	1.44
Saintpaul	15	7.21	1.44
Senftenberg	10	4.81	0.96
^c IIIa 18:z4,z23:-	9	4.33	0.86
Typhimurium	9	4.33	0.86
Schwarzengrund	8	3.85	0.77
Kentucky	6	2.88	0.57
Newport	6	2.88	0.57
^a Other serotypes	47	22.60	4.50
^b Unidentified isolates	2	0.96	0.19
Total serotyped isolates	208		19.92
Not typed	0		
Total positive	208		19.92
Total number of analyzed samples			
		1,044	

Serotypes 2005	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	44	20.47	4.76
Saintpaul	27	12.56	2.92
Heidelberg	25	11.63	2.70
Reading	18	8.37	1.95
Schwarzengrund	12	5.58	1.30
^c IIIa 18:z4,z23:-	11	5.12	1.19
Senftenberg	8	3.72	0.86
Agona	7	3.26	0.76
Albany	6	2.79	0.65
Kentucky	5	2.33	0.54
Muenchen	5	2.33	0.54
Newport	5	2.33	0.54
^a Other serotypes	40	18.60	4.32
^b Unidentified isolates	2	0.93	0.22
Total serotyped isolates	215		23.24
Not typed	0		
Total positive	215		23.24
Total number of analyzed samples			
		925	



Table 7—Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Turkey
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2005 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	44	20.47	4.76
Saintpaul	27	12.56	2.92
Heidelberg	25	11.63	2.70
Reading	18	8.37	1.95
Schwarzengrund	12	5.58	1.30
^c IIIa 18:z4,z23:-	11	5.12	1.19
Senftenberg	8	3.72	0.86
Agona	7	3.26	0.76
Albany	6	2.79	0.65
^d Typhimurium	6	2.79	0.65
^a Other serotypes	40	18.60	4.32
^b Unidentified isolates	2	0.93	0.22
Total serotyped isolates	215		23.24
Not typed	0		
Total positive	215		23.24
Total number of analyzed samples			
		925	

Serotypes 2006	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	31	34.44	6.98
Saintpaul	8	8.89	1.80
Heidelberg	7	7.78	1.58
Agona	5	5.56	1.13
Anatum	4	4.44	0.90
Kentucky	4	4.44	0.90
Muenchen	4	4.44	0.90
Derby	3	3.33	0.68
Senftenberg	3	3.33	0.68
Worthington	3	3.33	0.68
^a Other serotypes	17	18.89	3.83
^b Unidentified	1	1.11	0.23
Total serotyped isolates	90		20.27
Not typed	0		
Total positive	90		20.27
Total number of analyzed samples			
		444	



Table 7 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Turkey
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2006 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	31	34.44	6.98
Saintpaul	8	8.89	1.80
Heidelberg	7	7.78	1.58
Agona	5	5.56	1.13
Anatum	4	4.44	0.90
Kentucky	4	4.44	0.90
Muenchen	4	4.44	0.90
Derby	3	3.33	0.68
Senftenberg	3	3.33	0.68
^d Typhimurium	3	3.33	0.68
Worthington	3	3.33	0.68
^a Other serotypes	14	15.56	3.15
^b Unidentified	1	1.11	0.23
Total serotyped isolates	90		20.27
Not typed	0		
Total positive	90		20.27
Total number of analyzed samples		444	



Table 7 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Turkey
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2007	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	62	43.36	7.56
Heidelberg	17	11.89	2.07
Saintpaul	13	9.09	1.59
Agona	11	7.69	1.34
Newport	8	5.59	0.98
Reading	6	4.20	0.73
London	2	1.40	0.24
Minnesota	2	1.40	0.24
Muenchen	2	1.40	0.24
Schwarzengrund	2	1.40	0.24
Typhimurium	2	1.40	0.24
Uganda	2	1.40	0.24
^a Other serotypes	14	9.79	1.71
^b Unidentified	0		
Total serotyped isolates	143		17.44
Not typed	0		
Total positive	143		17.44
Total number of analyzed samples			
		820	

Serotypes 2007 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	62	43.36	7.56
Heidelberg	17	11.89	2.07
Saintpaul	13	9.09	1.59
Agona	11	7.69	1.34
Newport	8	5.59	0.98
Reading	6	4.20	0.73
^d Anatum	2	1.40	0.24
London	2	1.40	0.24
Minnesota	2	1.40	0.24
Muenchen	2	1.40	0.24
Schwarzengrund	2	1.40	0.24
Typhimurium	2	1.40	0.24
Uganda	2	1.40	0.24
^a Other serotypes	12	8.39	1.46
^b Unidentified	0		
Total serotyped isolates	143		17.44
Not typed	0		
Total positive	143		17.44
Total number of analyzed samples			
		820	



Table 7 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Turkey
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2008	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	35	25.93	4.00
Saintpaul	15	11.11	1.71
^c III 18:z4,z23:-	14	10.37	1.60
Schwarzengrund	8	5.93	0.91
Newport	7	5.19	0.80
Heidelberg	6	4.44	0.68
Senftenber	6	4.44	0.68
Agona	5	3.70	0.57
Muenchen	5	3.70	0.57
Worthington	5	3.70	0.57
^a Other serotypes	28	20.74	3.20
^b Unidentified	1	0.74	0.11
Total serotyped isolates	135		15.41
Not typed	0		
Total positive	135		15.41
Total number of analyzed samples	876		

Serotypes 2009	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Saintpaul	17	26.15	2.80
Hadar	14	21.54	2.30
Agona	5	7.69	0.82
Schwarzengrund	5	7.69	0.82
Senftenber	5	7.69	0.82
Albany	3	4.62	0.49
^c III 18:z4,z23:-	3	4.62	0.49
Derby	2	3.08	0.33
Heidelberg	2	3.08	0.33
Newport	2	3.08	0.33
^a Other serotypes	6	9.23	0.99
^b Unidentified	1	1.54	0.16
Total serotyped isolates	65		10.69
Not typed	0		
*Total positive	65		10.69
Total number of analyzed samples	608		



Table 7 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Turkey
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2010	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	15	16.85	1.72
Saintpaul	15	16.85	1.72
Heidelberg	9	10.11	1.03
Albany	8	8.99	0.92
^c III 18:z4,z23:-	7	7.89	0.80
Schwarzengrund	6	6.74	0.69
Senftenber	6	6.74	0.69
Anatum	4	4.49	0.46
Newport	3	3.37	0.34
^c III 18:24,z23:-	2	2.25	0.23
Montevideo	2	2.25	0.23
Reading	2	2.25	0.23
^a Other serotypes	10	11.24	1.15
^b Unidentified	0		
Total serotyped isolates	89		10.19
Not typed	0		
*Total positive	89		10.19
Total number of analyzed samples	873		



Table 7 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Ground Turkey
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2010 (Variants Combined) ^d	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	15	16.85	1.72
Saintpaul	15	16.85	1.72
Heidelberg	9	10.11	1.03
Albany	8	8.99	0.92
^c III 18:z4,z23:-	7	7.89	0.80
Schwarzengrund	6	6.74	0.69
Senftenber	6	6.74	0.69
Anatum	4	4.49	0.46
Newport	3	3.37	0.34
^c III 18:24,z23:-	2	2.25	0.23
Montevideo	2	2.25	0.23
Reading	2	2.25	0.23
^d Typhimurium	2	2.25	0.23
^a Other serotypes	8	8.99	0.92
^b Unidentified	0		
Total serotyped isolates	89		10.19
Not typed	0		
*Total positive	89		10.19
Total number of analyzed samples	873		

* The percentages listed for total positive isolates may not equal the sum of data in the Percent of Analyzed Samples column due to rounding.

^a The ten most commonly isolated serotypes during a listed year are identified by name while less commonly identified serotypes are included in the “other serotypes” category. When there is more than one serotype in tenth place, all serotypes in tenth place are listed.

^bThe “unidentified” designation includes isolates for which a single specific serotype could not be determined including those that were solely named through antigenic formulas.

^cPrior to 2004, isolates fitting the designation in b were included in the “unidentified isolates” category.

^dTyphimurium includes Typhimurium 5- (formerly Copenhagen), and Anatum includes Anatum var 15+,34+.

Note: For information on the most commonly identified serotypes causing human infection in the United States see CDC (2006).



Table 8
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Turkeys
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2006	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	65	32.83	2.33
Heidelberg	33	16.67	1.18
Reading	13	6.57	0.47
Schwarzengrund	13	6.57	0.47
Saintpaul	10	5.05	0.36
Agona	8	4.04	0.29
Senftenberg	8	4.04	0.29
Anatum	4	2.02	0.14
Derby	4	2.02	0.14
Muenster	4	2.02	0.14
^a Other serotypes	32	16.16	1.15
^b Unidentified	4	2.02	0.14
Total serotyped isolates	198		7.11
Not typed	0		
Total positive	198		7.11
Total number of analyzed samples	2,785		

Serotypes 2006 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	65	32.83	2.33
Heidelberg	33	16.67	1.18
Reading	13	6.57	0.47
Schwarzengrund	13	6.57	0.47
Saintpaul	10	5.05	0.36
Agona	8	4.04	0.29
Senftenberg	8	4.04	0.29
^c Anatum	5	2.53	0.18
Derby	4	2.02	0.14
Muenster	4	2.02	0.14
^a Other serotypes	31	15.66	1.11
^b Unidentified	4	2.02	0.14
Total serotyped isolates	198		7.11
Not typed	0		
Total positive	198		7.11
Total number of analyzed samples	2,785		



Table 8 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Turkeys
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2007	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	54	50.00	3.10
Senftenberg	9	8.33	0.52
Saintpaul	8	7.41	0.46
Heidelberg	6	5.56	0.34
Newport	5	4.63	0.29
Agona	3	2.78	0.17
Berta	3	2.78	0.17
Montevideo	3	2.78	0.17
Mbandaka	2	1.85	0.11
Muenchen	2	1.85	0.11
Reading	2	1.85	0.11
Schwarzengrund	2	1.85	0.11
^a Other serotypes	8	7.41	0.46
^b Unidentified	1	0.93	0.06
Total serotyped isolates	108		6.19
Not typed	0		
Total positive	108		6.19
Total number of analyzed samples	1,744		

Serotypes 2007 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	54	50.00	3.10
Senftenberg	9	8.33	0.52
Saintpaul	8	7.41	0.46
Heidelberg	6	5.56	0.34
Newport	5	4.63	0.29
Agona	3	2.78	0.17
Berta	3	2.78	0.17
Montevideo	3	2.78	0.17
Mbandaka	2	1.85	0.11
Muenchen	2	1.85	0.11
Reading	2	1.85	0.11
Schwarzengrund	2	1.85	0.11
^c Typhimurium	2	1.85	0.11
^a Other serotypes	6	5.56	0.34
^b Unidentified	1	0.93	0.06
Total serotyped isolates	108		6.19
Not typed	0		
Total positive	108		6.19
Total number of analyzed samples	1,744		



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Food Safety
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Service

Table 8 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Turkeys
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2008	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	3	37.50	2.33
Agona	1	12.50	0.78
Berta	1	12.50	0.78
Newport	1	12.50	0.78
Schwarzengrund	1	12.50	0.78
^a Other serotypes	0		
^b Unidentified	1	12.50	0.78
Total serotyped isolates	8		6.20
Not typed	0		
*Total positive	8		6.20
Total number of analyzed samples			
		129	



Table 8 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Turkeys
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2009	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	18	33.33	1.25
Agona	9	16.67	0.63
Albany	3	5.56	0.21
Muenchen	3	5.56	0.21
Senftenberg	3	5.56	0.21
Derby	2	3.70	0.14
Heidelberg	2	3.70	0.14
Kentucky	2	3.70	0.14
4,12:d:-	1	1.85	0.07
8,20:-:z6	1	1.85	0.07
Anatum	1	1.85	0.07
Infantis	1	1.85	0.07
Johannesburg	1	1.85	0.07
Mbandaka	1	1.85	0.07
Montevideo	1	1.85	0.07
Newport	1	1.85	0.07
Saintpaul	1	1.85	0.07
Schwarzengrund	1	1.85	0.07
Typhimurium	1	1.85	0.07
Typhimurium 5-	1	1.85	0.07
^a Other serotypes	0		
^b Unidentified	0		
Total serotyped isolates	54		3.77
Not typed	0		
Total positive	54		3.77
Total number of analyzed samples			
		1,432	



Table 8 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Turkeys
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2009 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	18	33.33	1.25
Agona	9	16.67	0.63
Albany	3	5.56	0.21
Muenchen	3	5.56	0.21
Senftenberg	3	5.56	0.21
Derby	2	3.70	0.14
Heidelberg	2	3.70	0.14
Kentucky	2	3.70	0.14
^c Typhimurium	2	3.70	0.14
4,12:d:-	1	1.85	0.07
8,20:-:z6	1	1.85	0.07
Anatum	1	1.85	0.07
Infantis	1	1.85	0.07
Johannesburg	1	1.85	0.07
Mbandaka	1	1.85	0.07
Montevideo	1	1.85	0.07
Newport	1	1.85	0.07
Saintpaul	1	1.85	0.07
Schwarzengrund	1	1.85	0.07
^a Other serotypes	0		
^b Unidentified	0		
Total serotyped isolates	54		3.77
Not typed	0		
Total positive	54		3.77
Total number of analyzed samples		1,432	



Table 8 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Turkeys
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2010	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	15	22.73	1.04
Muenchen	9	13.64	0.62
Saintpaul	6	9.09	0.42
Heidelberg	5	7.58	0.35
Schwarzengrund	5	7.58	0.35
Agona	4	6.06	0.28
Brandenburg	3	4.55	0.21
Berta	2	3.03	0.14
Newport	2	3.03	0.14
Typhimurium 5-	2	3.03	0.14
^a Other serotypes	11	16.67	0.76
^b Unidentified	1	1.52	0.07
Total serotyped isolates	65		4.50
Not typed	1		0.07
*Total positive	66		4.57
Total number of analyzed samples			
		1,444	



Table 8 - Continued
Profile of Serotypes from Analyzed PR/HACCP Verification Samples by Calendar Year.
Turkeys
(1998–2005 'A' Set Samples; 2006–2010 All Samples)

Serotypes 2010 (Variants Combined) ^c	Number of Isolates	Percent of Total Positive	Percent of Analyzed Samples
Hadar	15	22.73	1.04
Muenchen	9	13.64	0.62
Saintpaul	6	9.09	0.42
Heidelberg	5	7.58	0.35
Schwarzengrund	5	7.58	0.35
Agona	4	6.06	0.28
Brandenburg	3	4.55	0.21
^c Anatum	2	3.03	0.14
Berta	2	3.03	0.14
Newport	2	3.03	0.14
Typhimurium 5-	2	3.03	0.14
^a Other serotypes	9	13.64	0.62
^b Unidentified	1	1.52	0.07
Total serotyped isolates	65		4.50
Not typed	1		0.07
*Total positive	66		4.57
Total number of analyzed samples	1,444		

*The percentages listed for total positive isolates may not equal the sum of data presented in the Percent of Analyzed Samples column due to rounding.

^a The ten most commonly isolated serotypes during a listed year are identified by name while less commonly identified serotypes are included in the “other serotypes” category. When there is more than one serotype in tenth place, all serotypes in tenth place are listed.

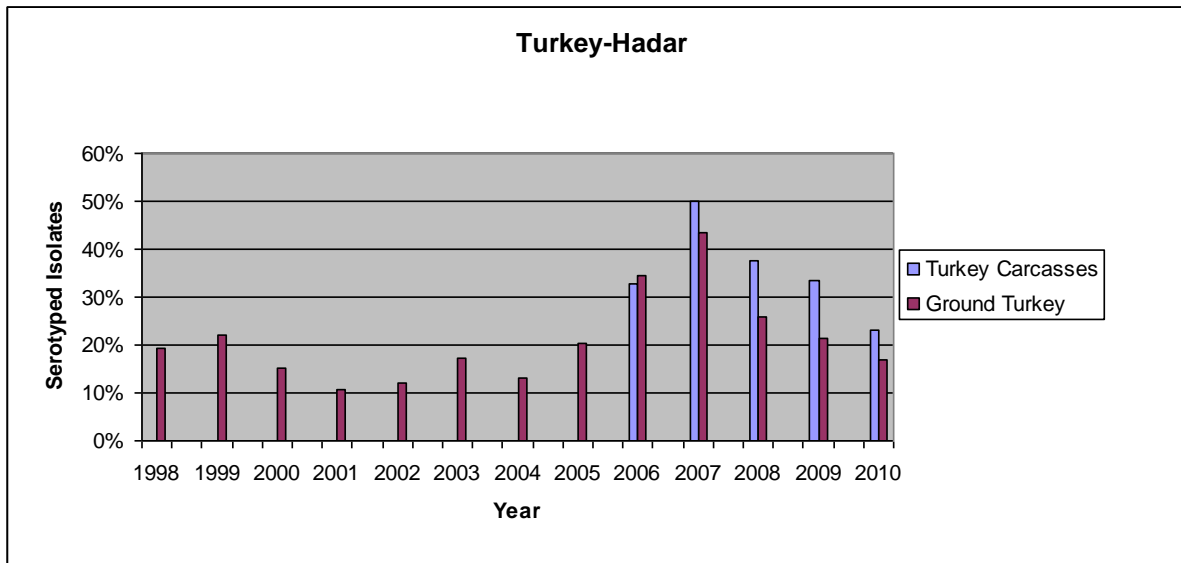
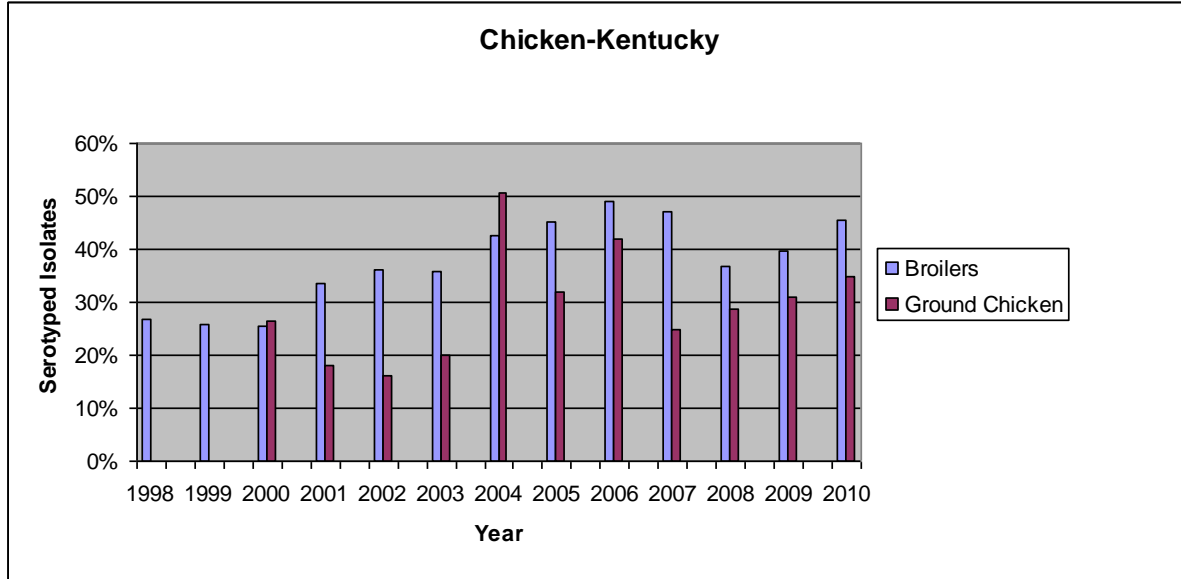
^bThe “unidentified” designation includes isolates for which a single specific serotype could not be determined including those that were solely named through antigenic formulas.

^c Typhimurium includes Typhimurium 5- (formerly Copenhagen), and Anatum includes Anatum var. 15+ (formerly Newington).

Note: For information on the most commonly identified serotypes causing human infection in the United States see CDC (2006).



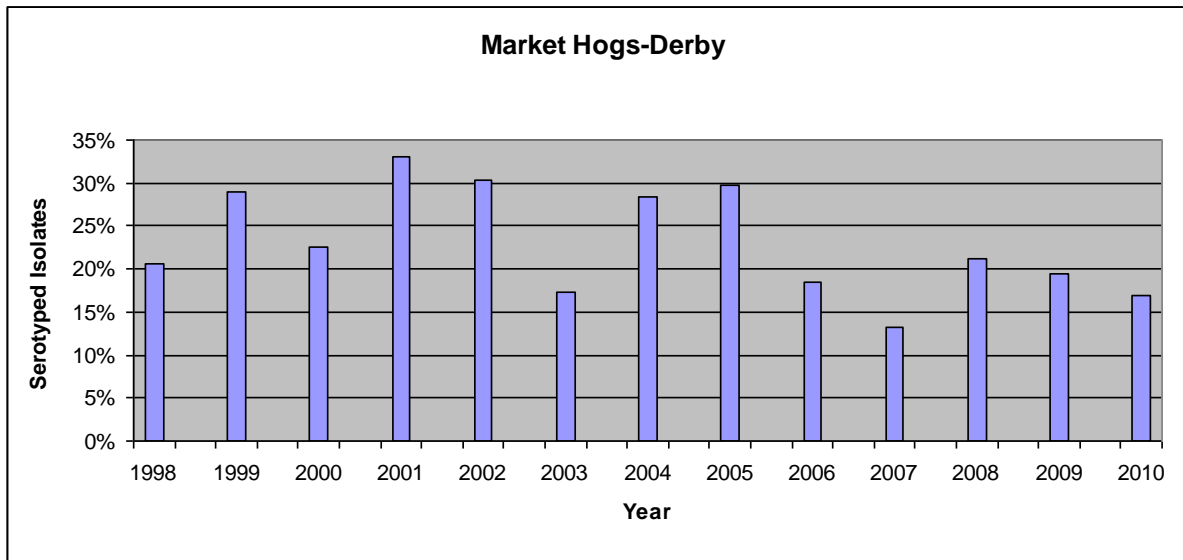
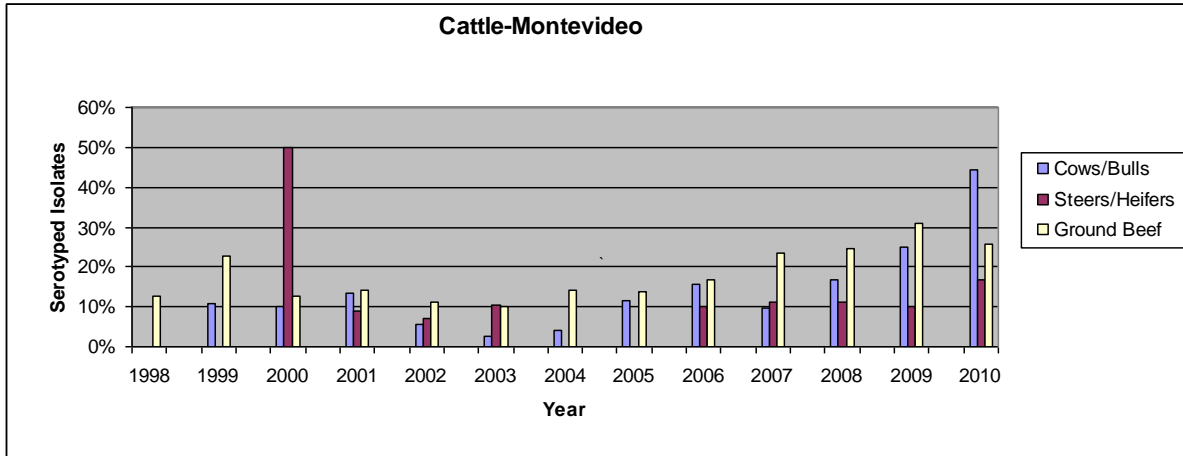
Figure 1
Top Serotypes by Species—PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)



*Please note that the y-axis percent varies from graph to graph.



Figure 1 - Continued
Top Serotypes by Species—PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)



*Please note that the y-axis percent varies from graph to graph.



Figure 2
Typhimurium—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)

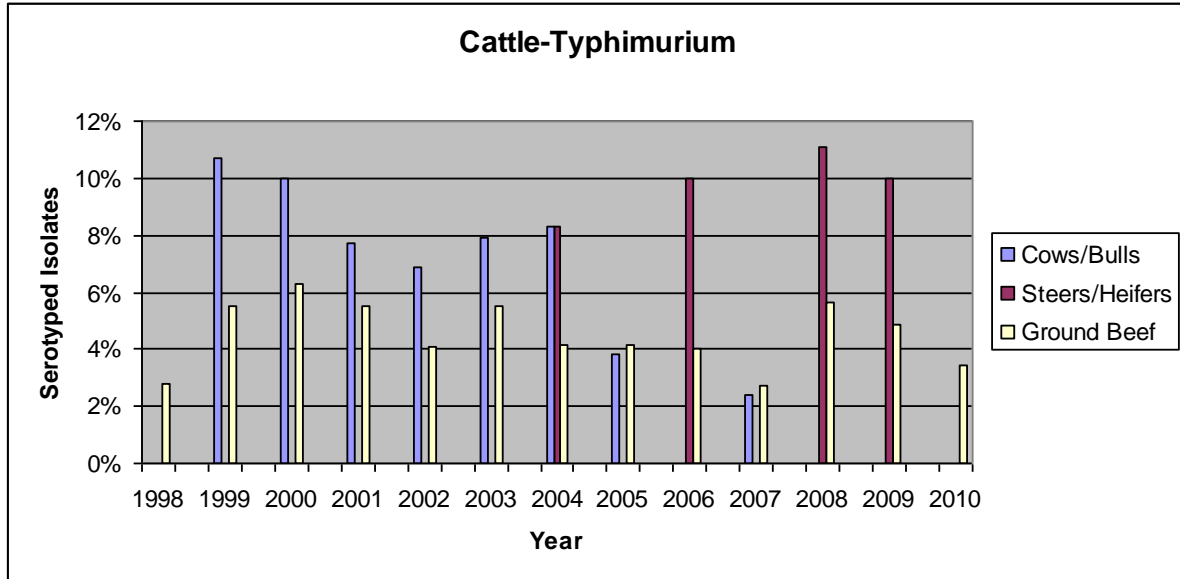
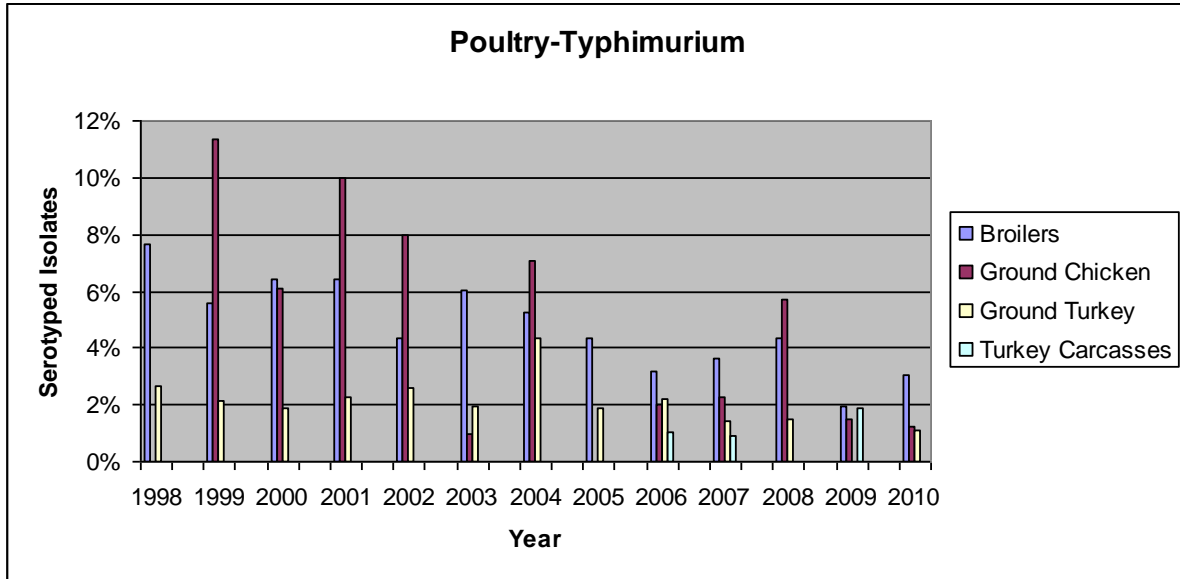
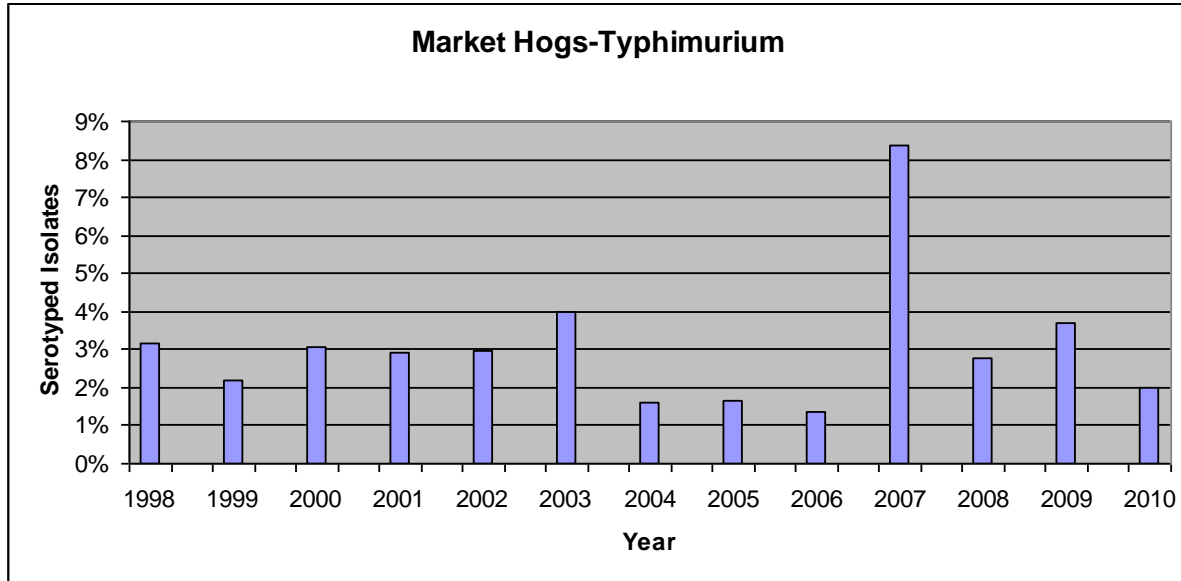




Figure 2 - Continued
Typhimurium—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)



*Please note that the y-axis percent varies from graph to graph.



Figure 3
Typhimurium 5-**-USDA, FSIS, PR/HACCP Verification Sampling by Calendar
Year* (1998-2005 "A" Set Samples; 2006-2010 All Samples)

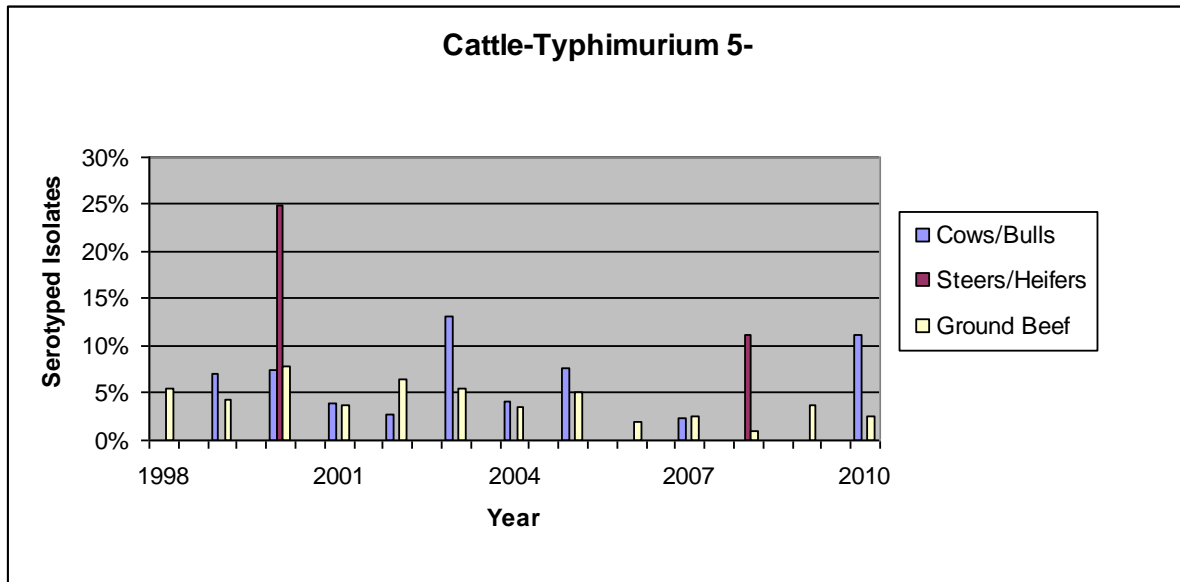
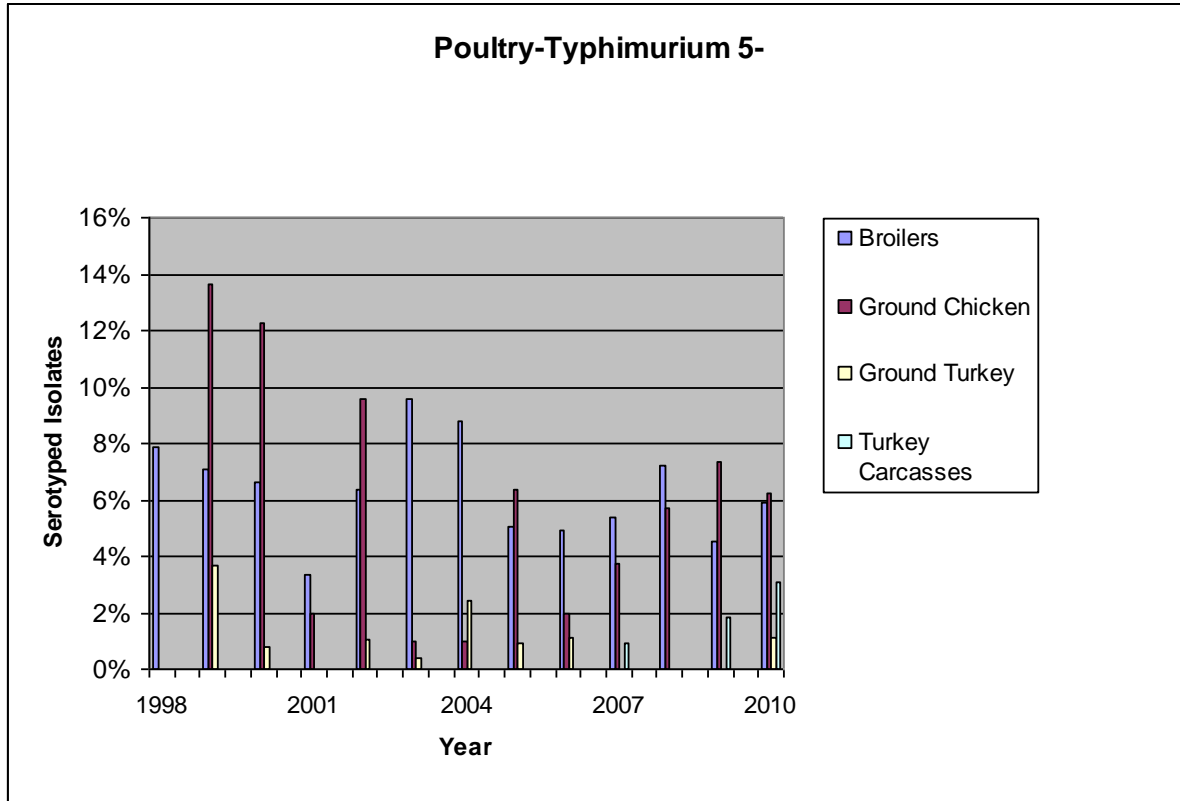
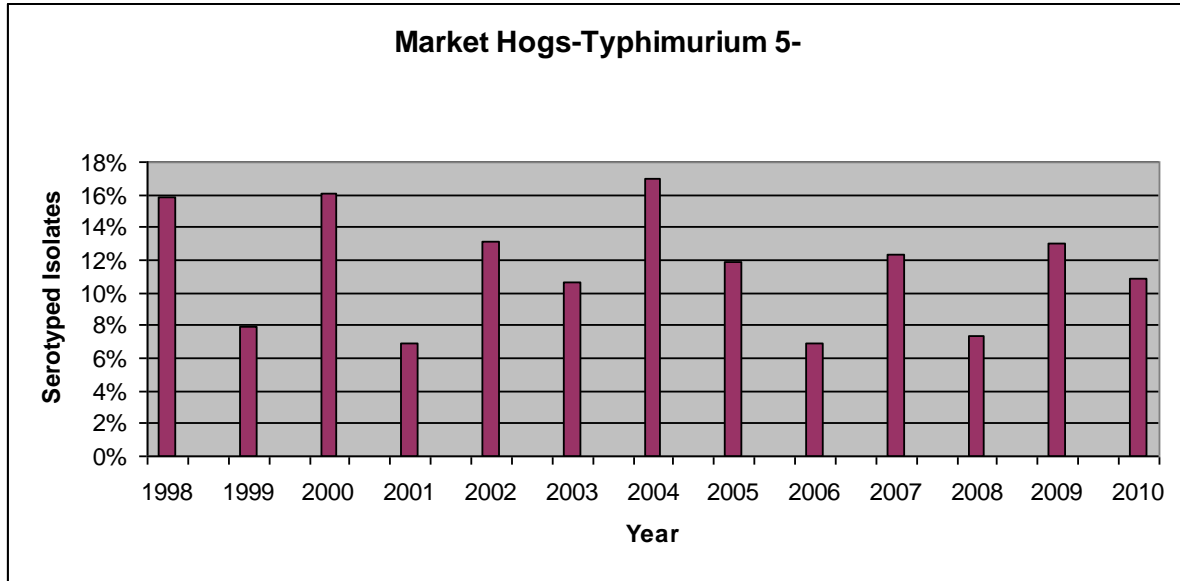




Figure 3 - Continued
Typhimurium 5-**-USDA, FSIS, PR/HACCP Verification Sampling by Calendar
Year* (1998–2005 “A” Set Samples; 2006–2010 All Samples)



*Please note that the y-axis percent varies from graph to graph.

** Formerly Typhimurium var. Copenhagen



Figure 4
Enteritidis—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)

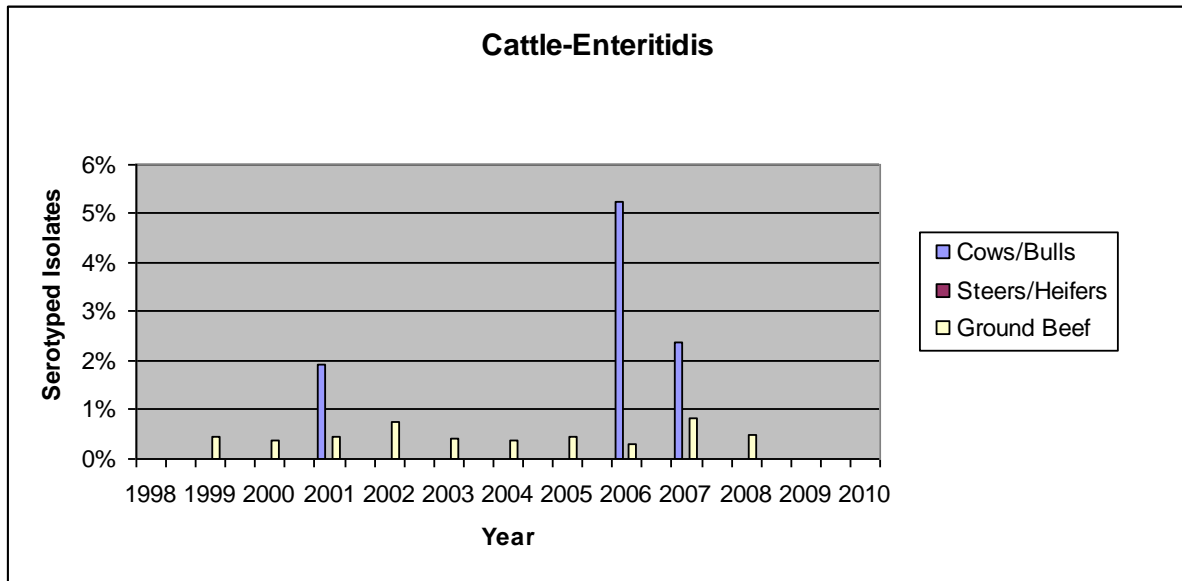
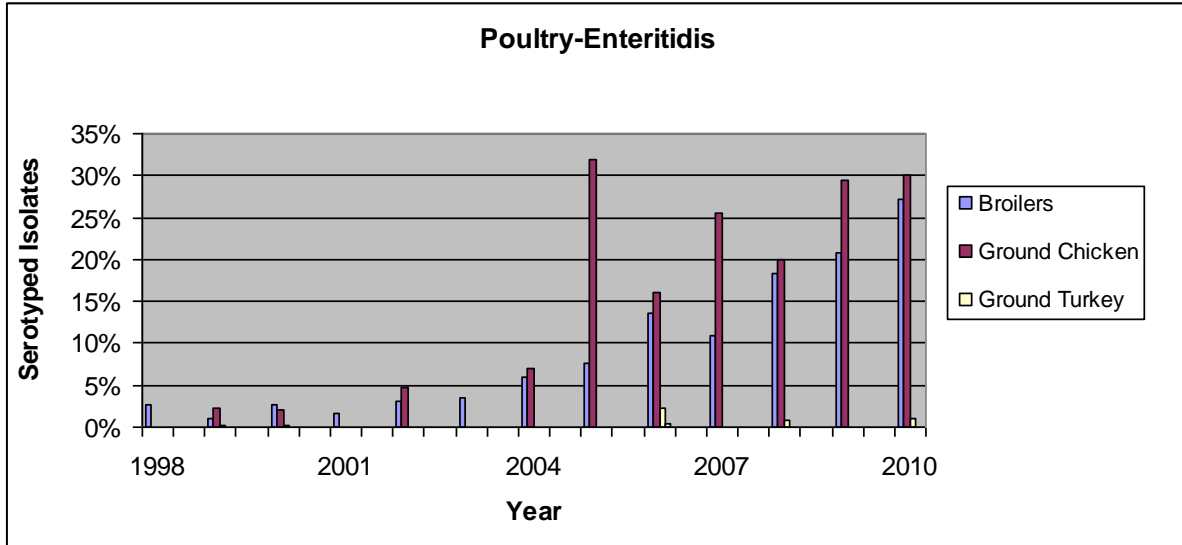
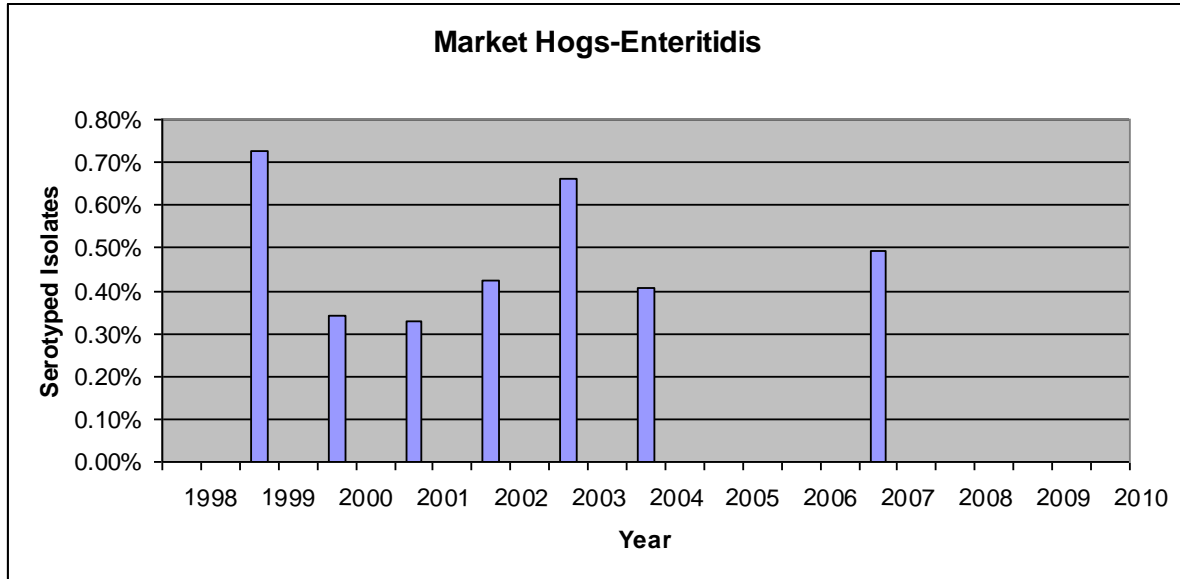




Figure 4 - Continued
Enteritidis—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)



*Please note that the y-axis percent varies from graph to graph.



Figure 5
Newport—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)

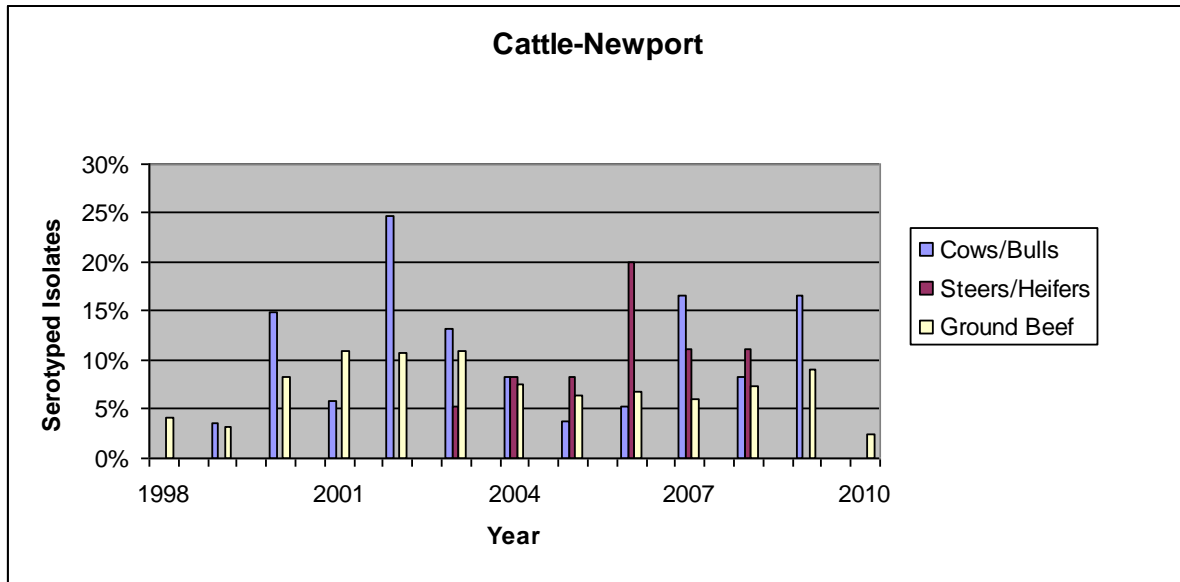
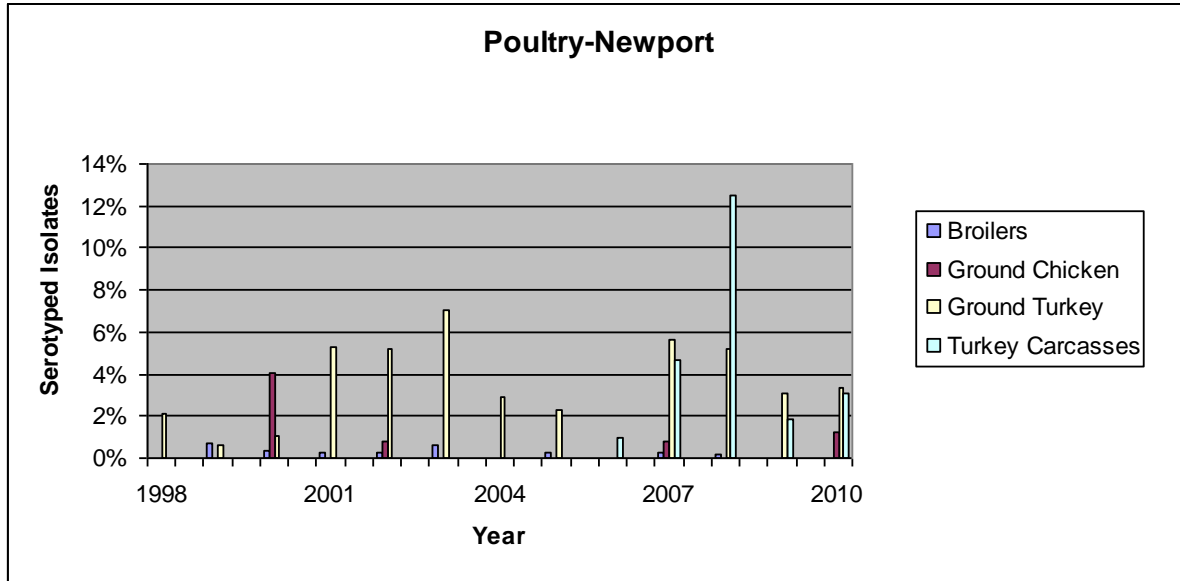
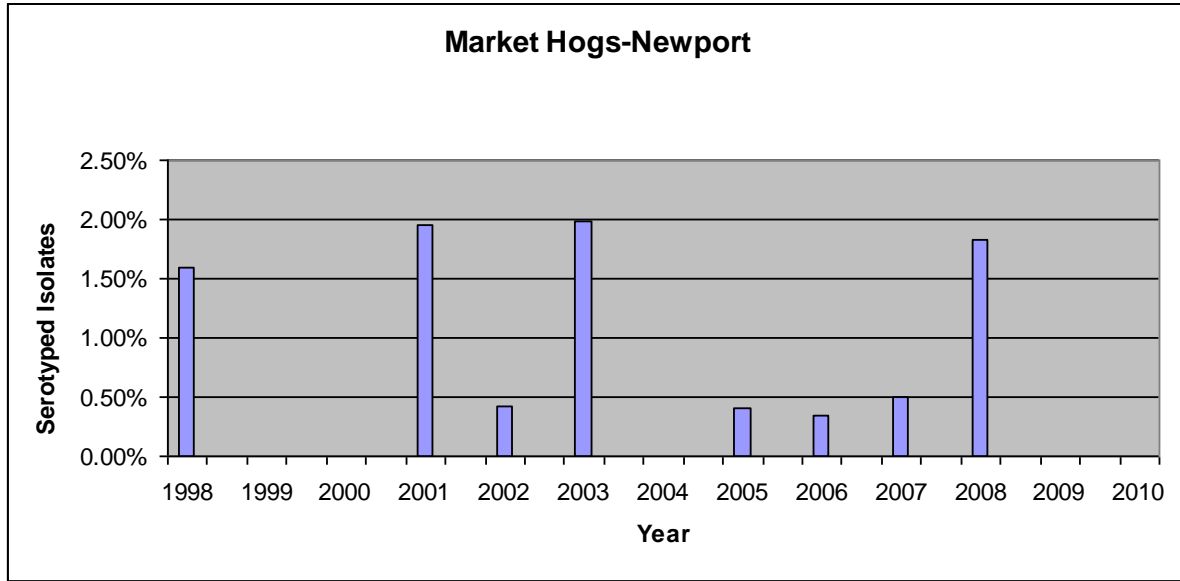




Figure 5 - Continued
Newport—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)



*Please note that the y-axis percent varies from graph to graph.



Figure 6
Javiana—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)

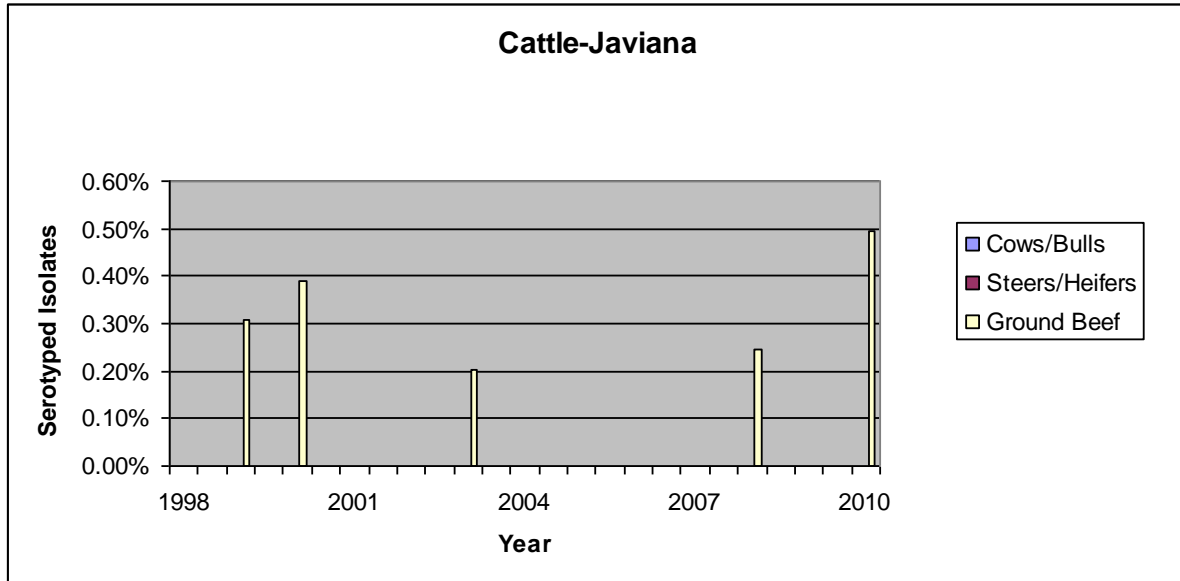
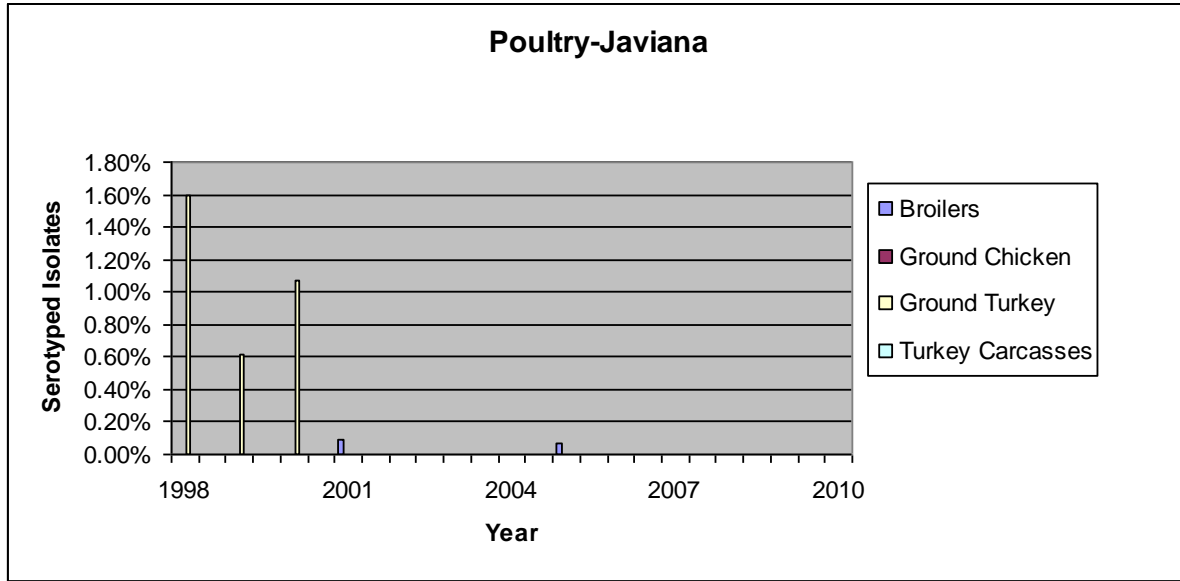
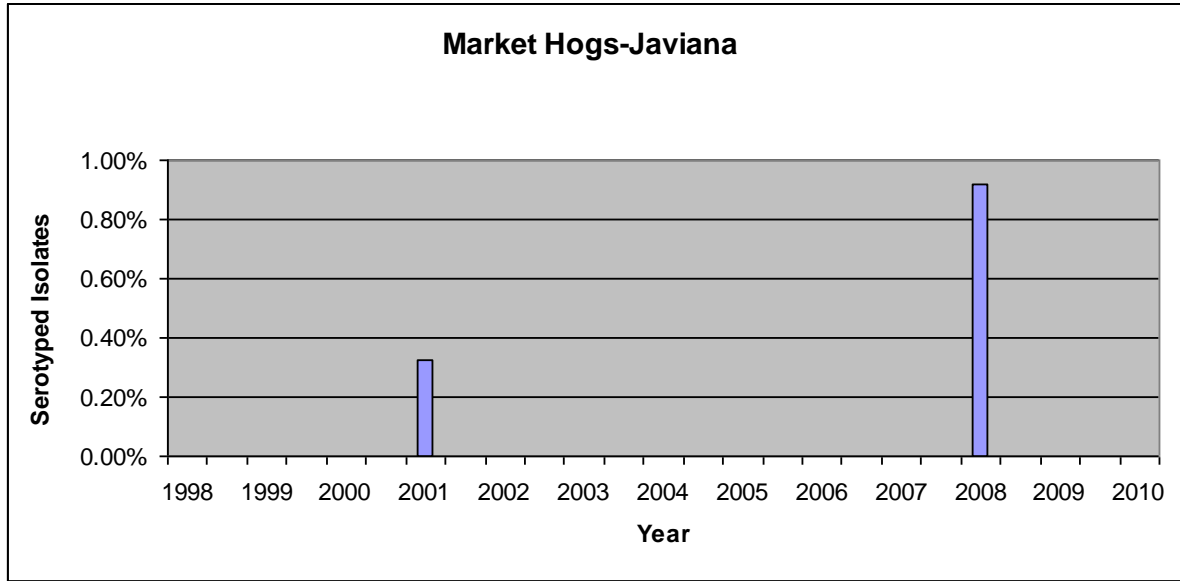




Figure 6 - Continued
Javiana—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)



*Please note that the y-axis percent varies from graph to graph.



Figure 7
Heidelberg—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)

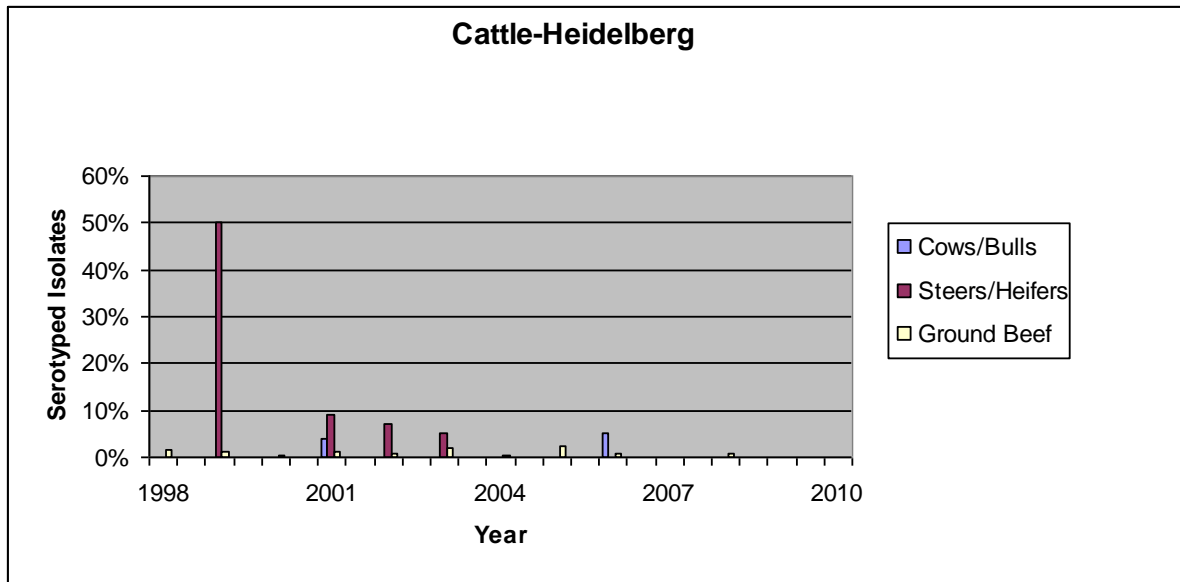
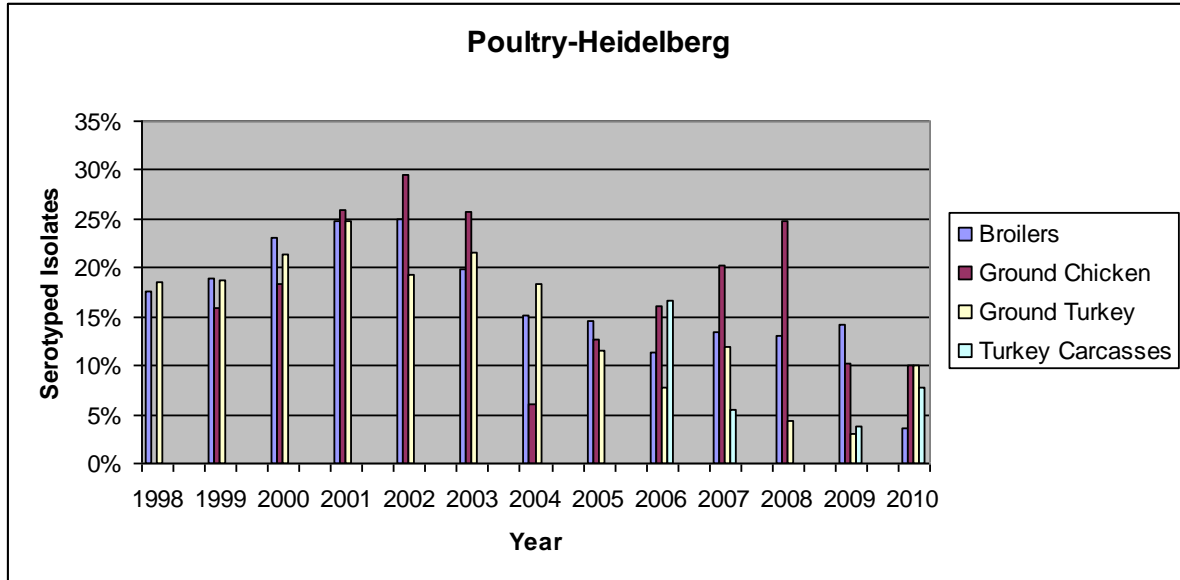
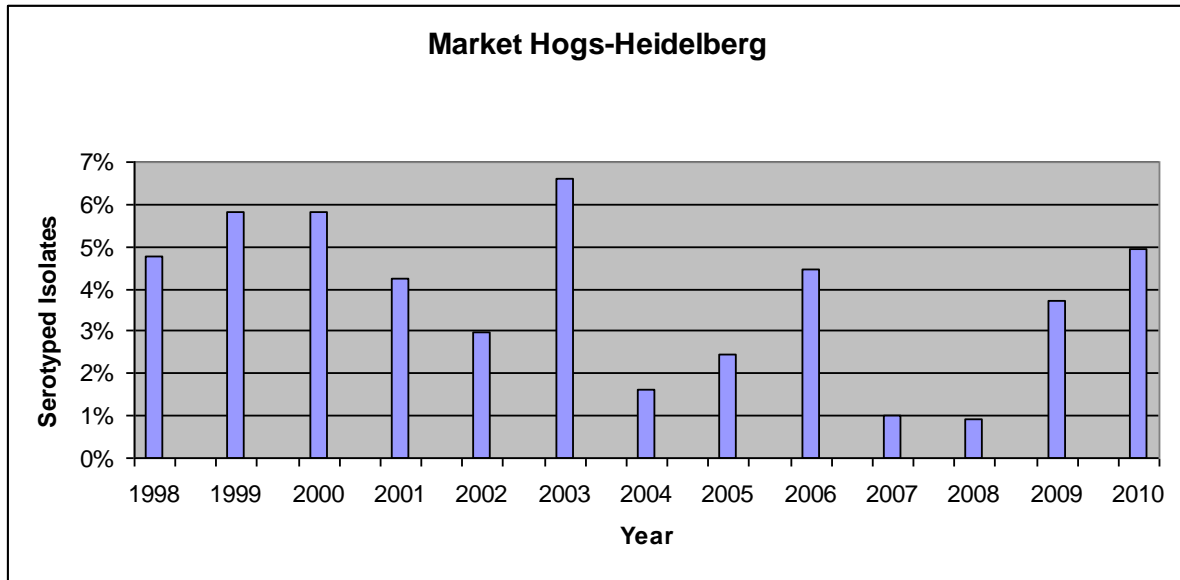




Figure 7 - Continued
Heidelberg—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)



*Please note that the y-axis percent varies from graph to graph.



Figure 8
Montevideo—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)

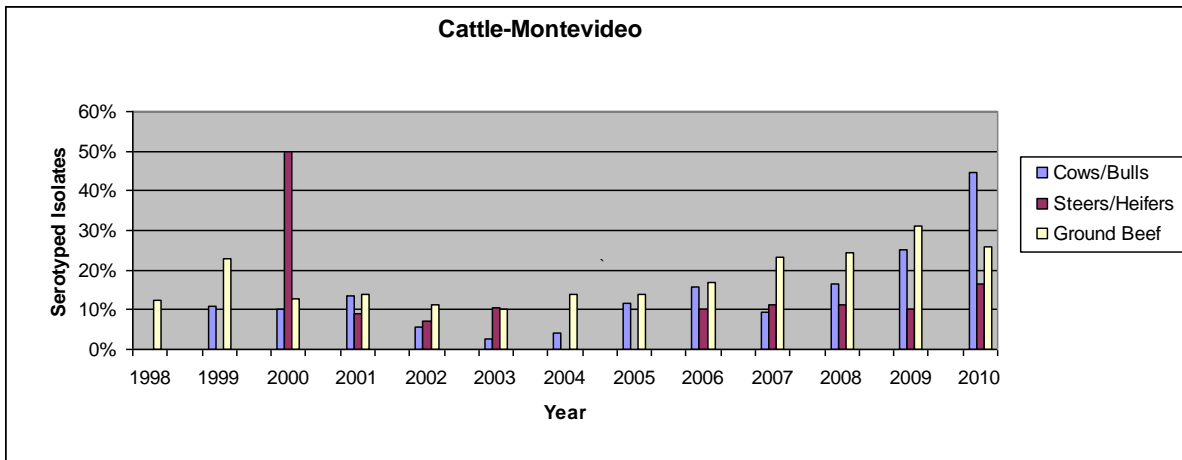
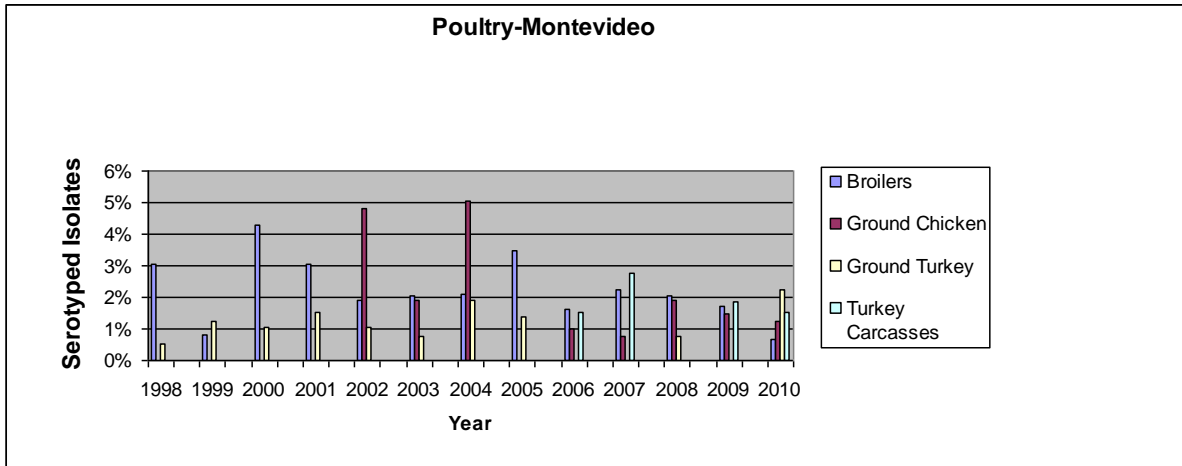
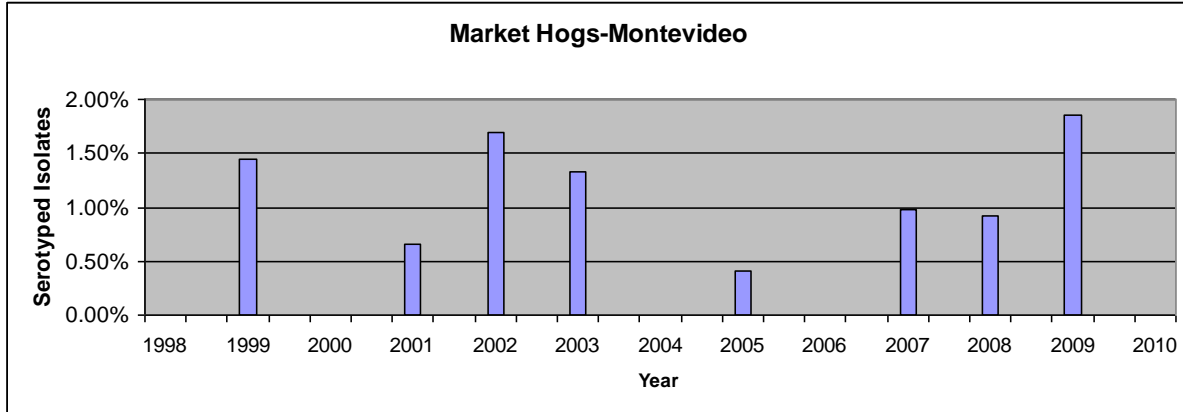




Figure 8 - Continued
Montevideo—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)



*Please note that the y-axis percent varies from graph to graph.



Figure 9
4, 5, 12:i:—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)

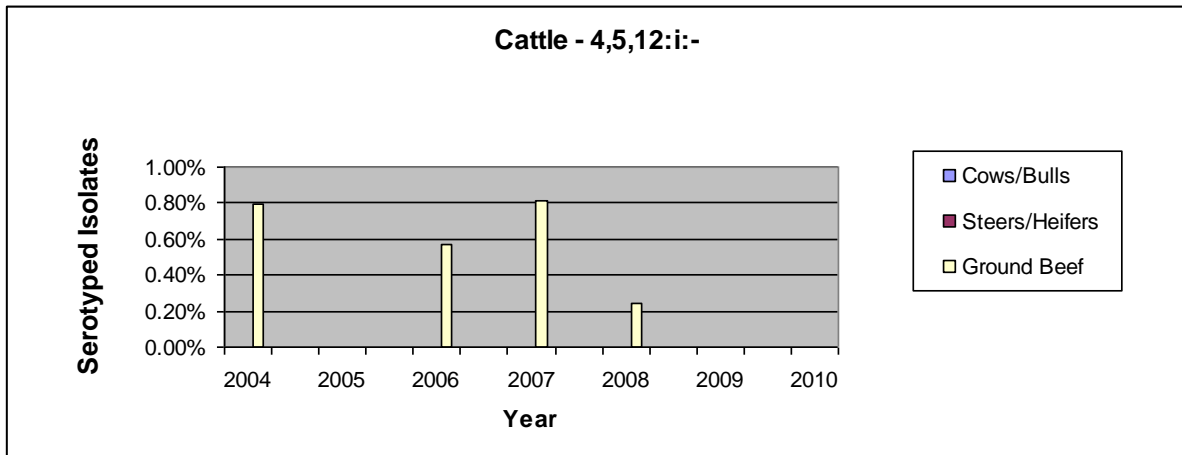
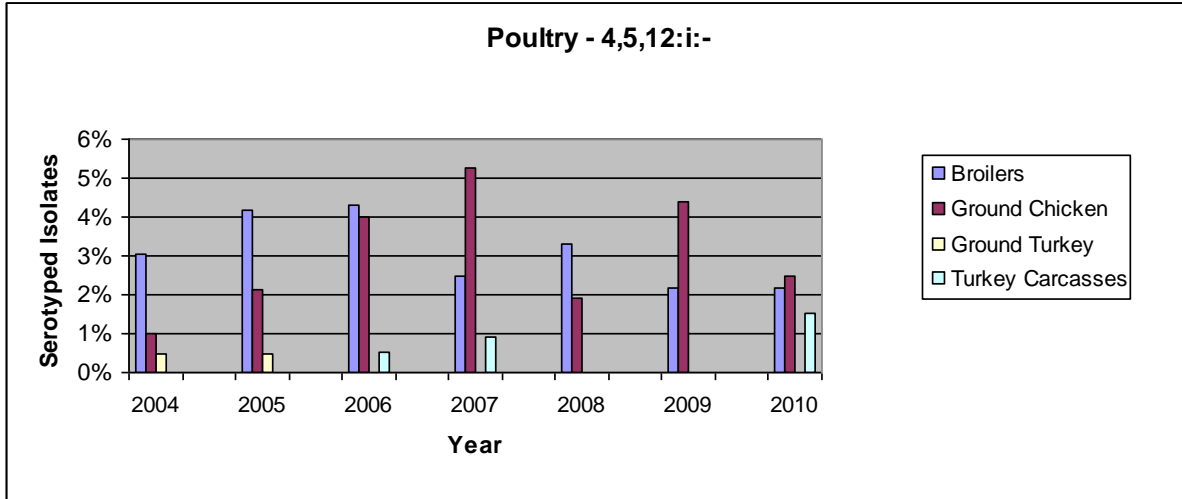
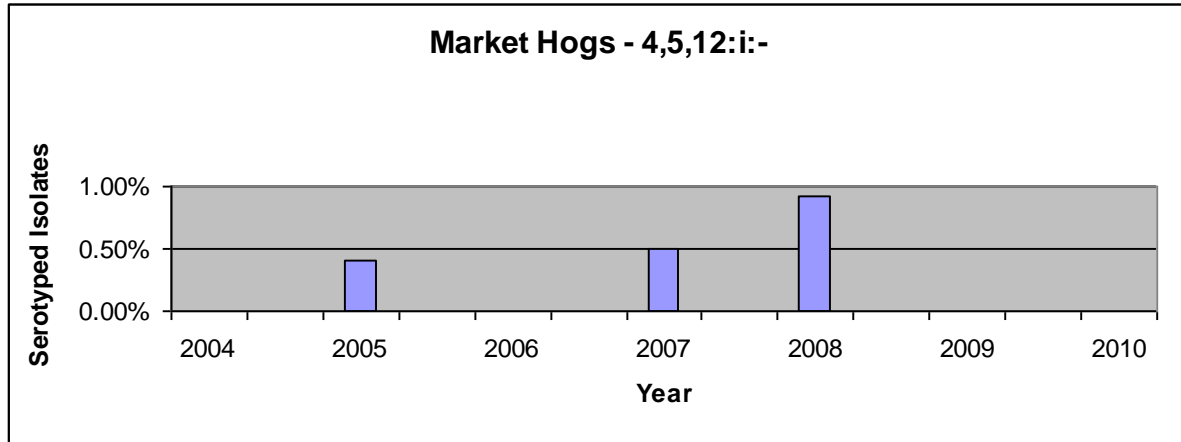




Figure 9 - Continued
4,5,12:i:- —USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)



*Please note that the y-axis percent varies from graph to graph.



Figure 10
Saintpaul—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)

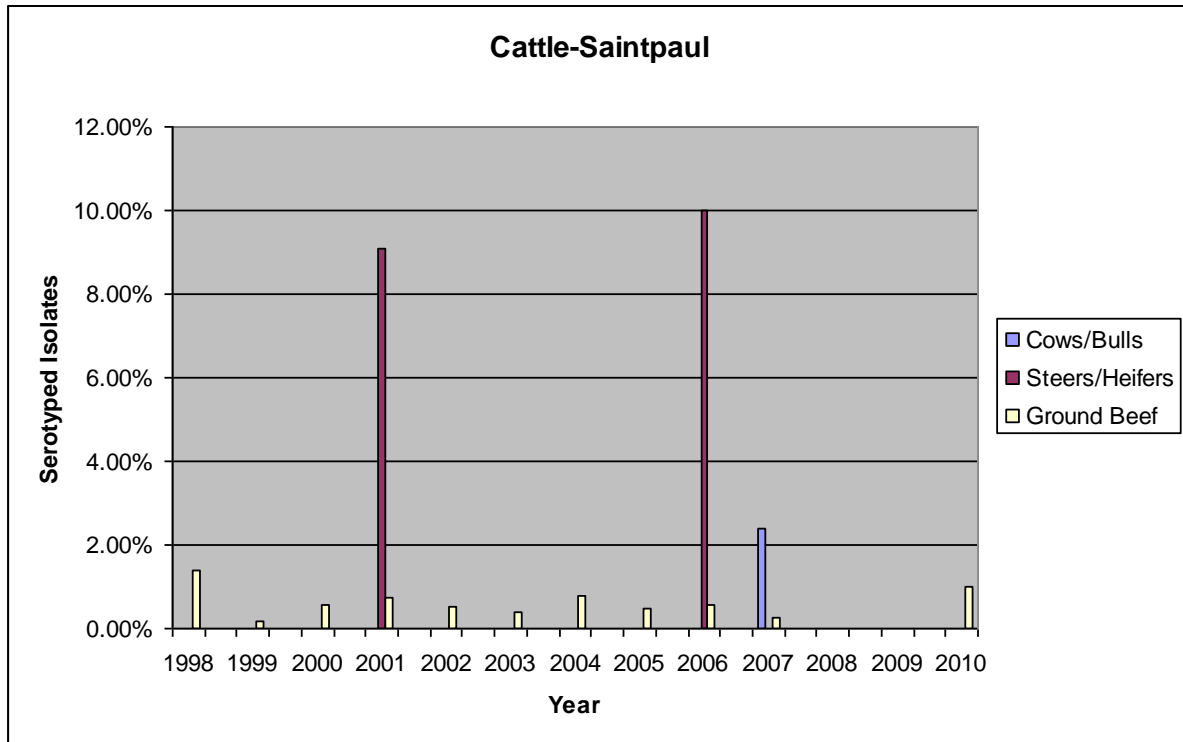
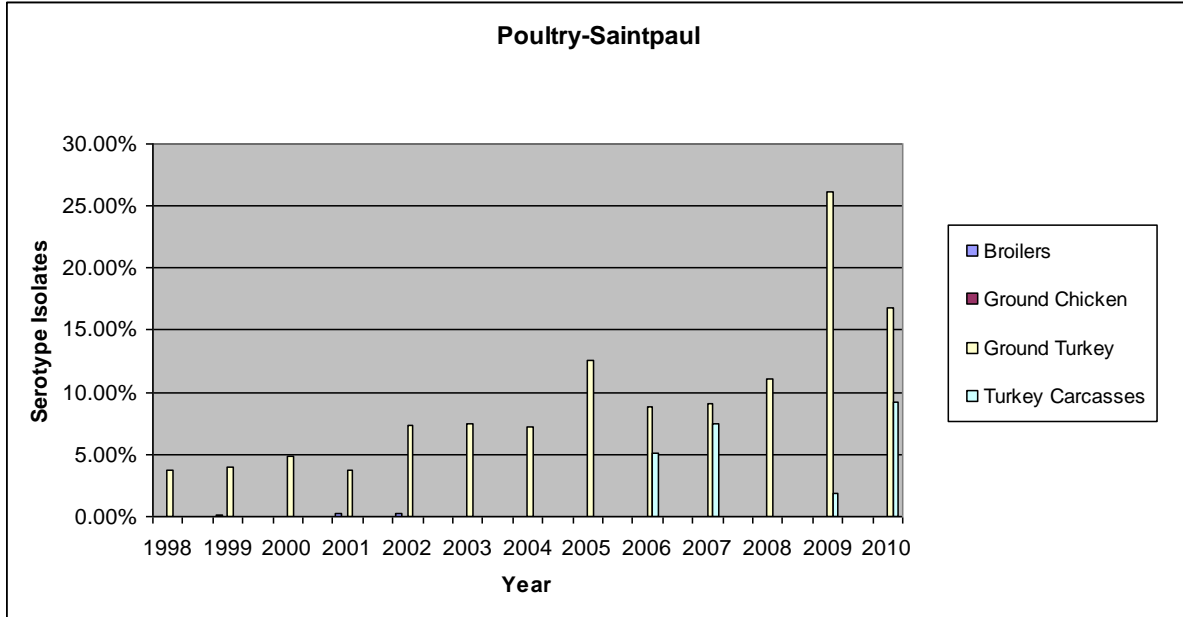
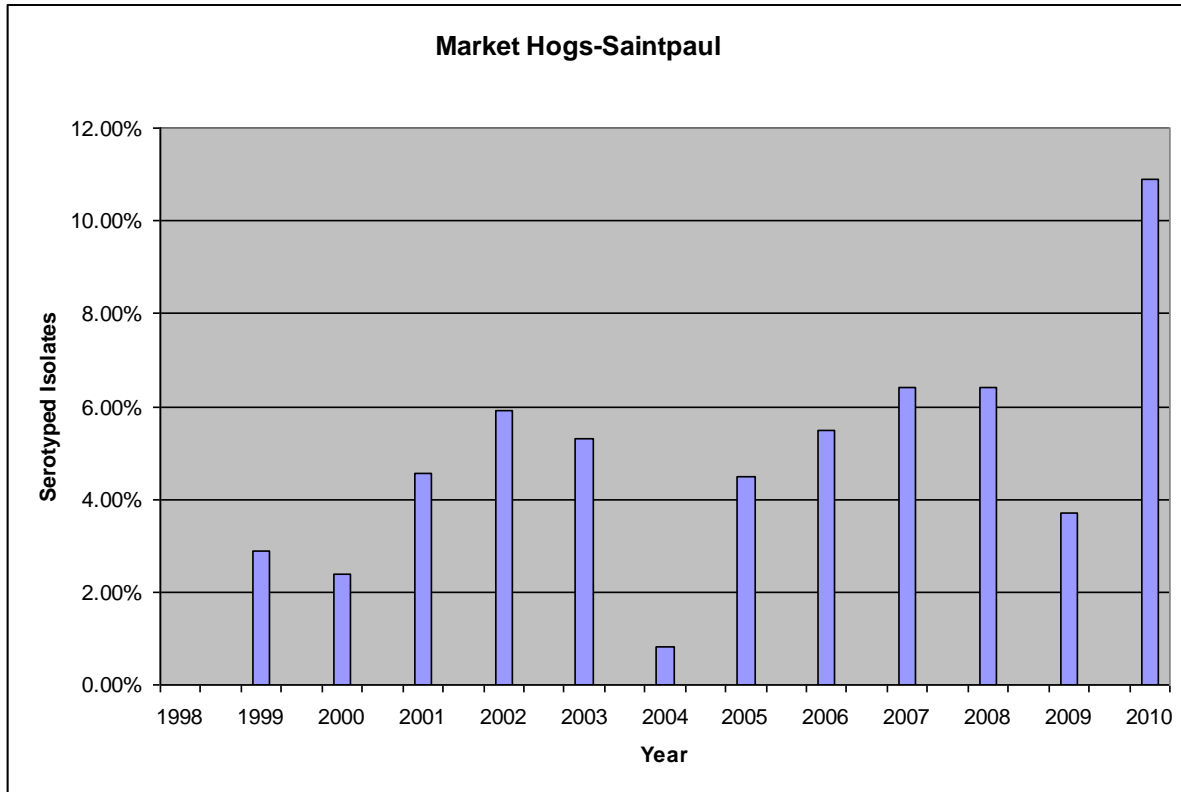




Figure 10 - Continued
Saintpaul—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)



*Please note that the y-axis percent varies from graph to graph.



Figure 11
Muenchen—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)

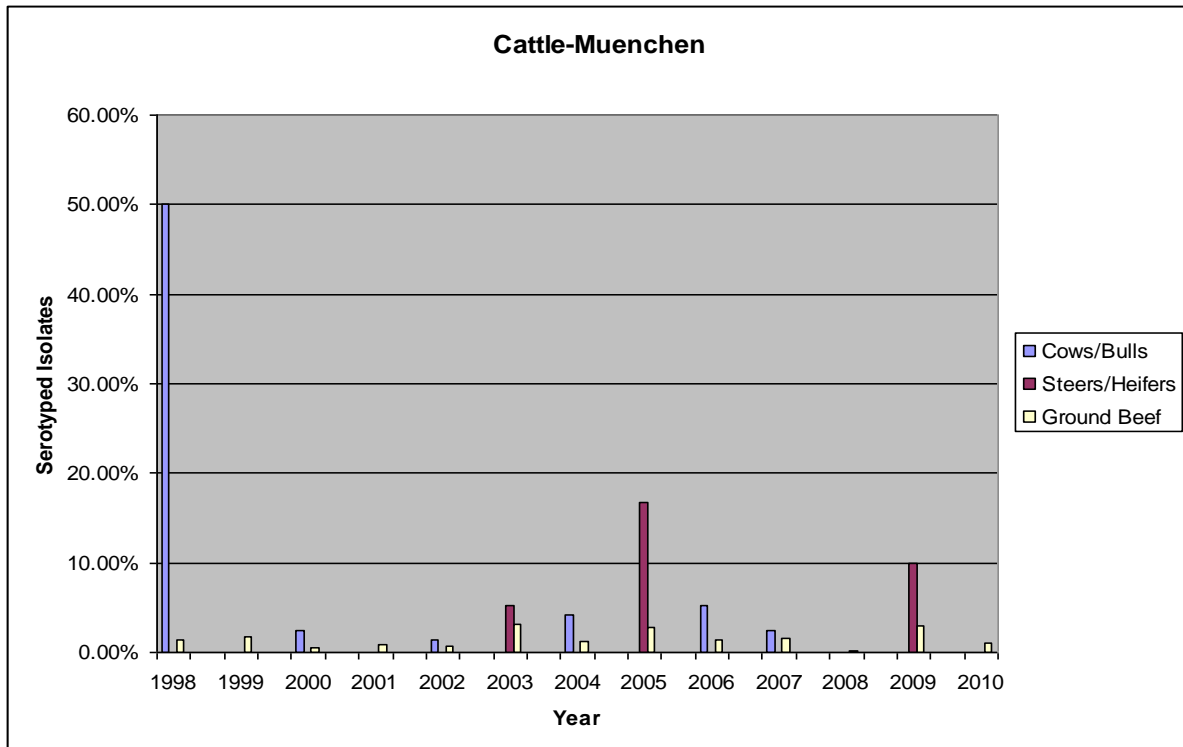
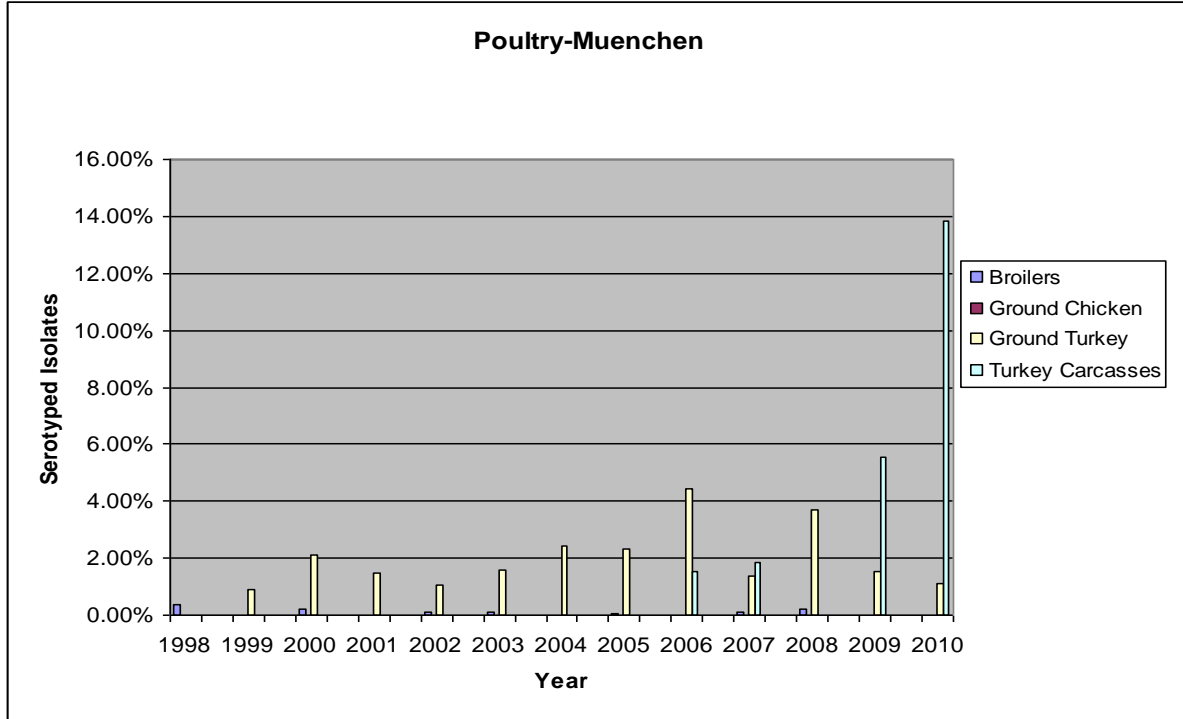
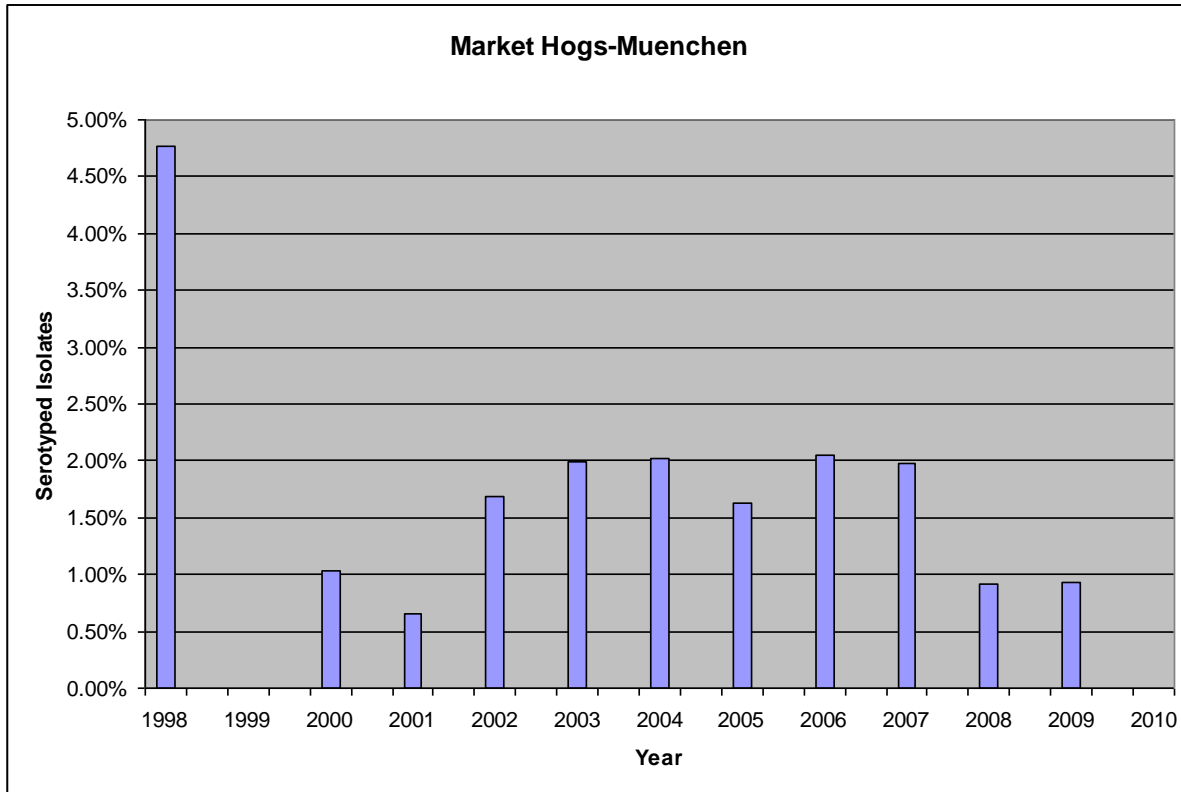




Figure 11 - Continued
Muenchen—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)



*Please note that the y-axis percent varies from graph to graph.



Figure 12
Infantis—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)

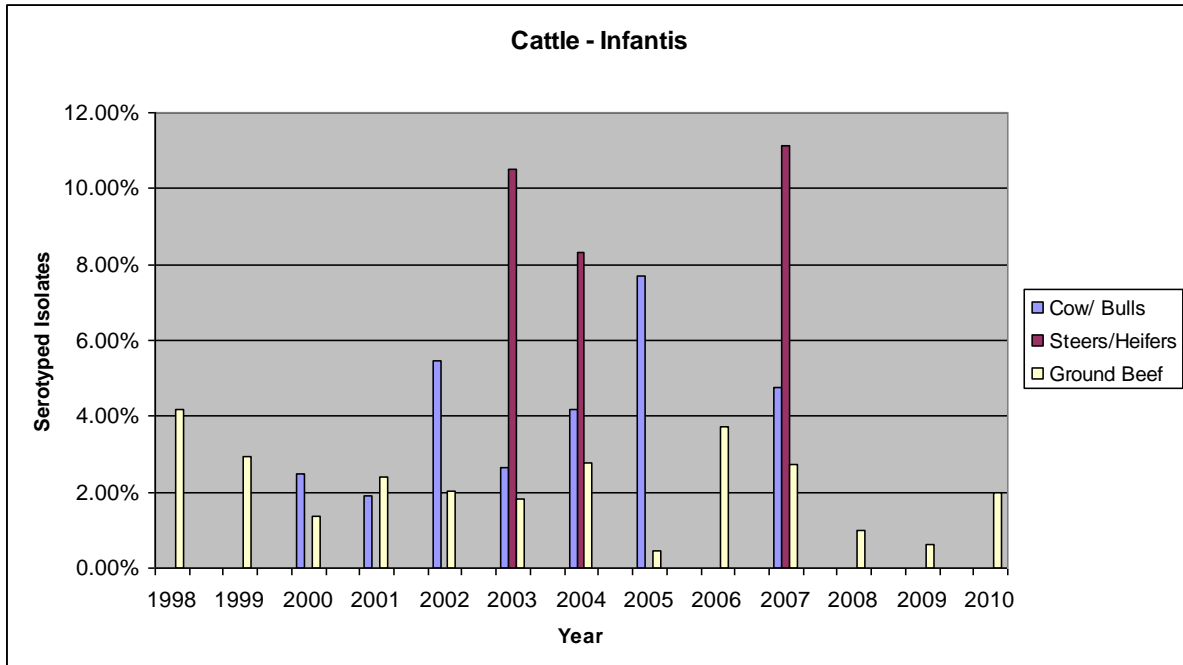
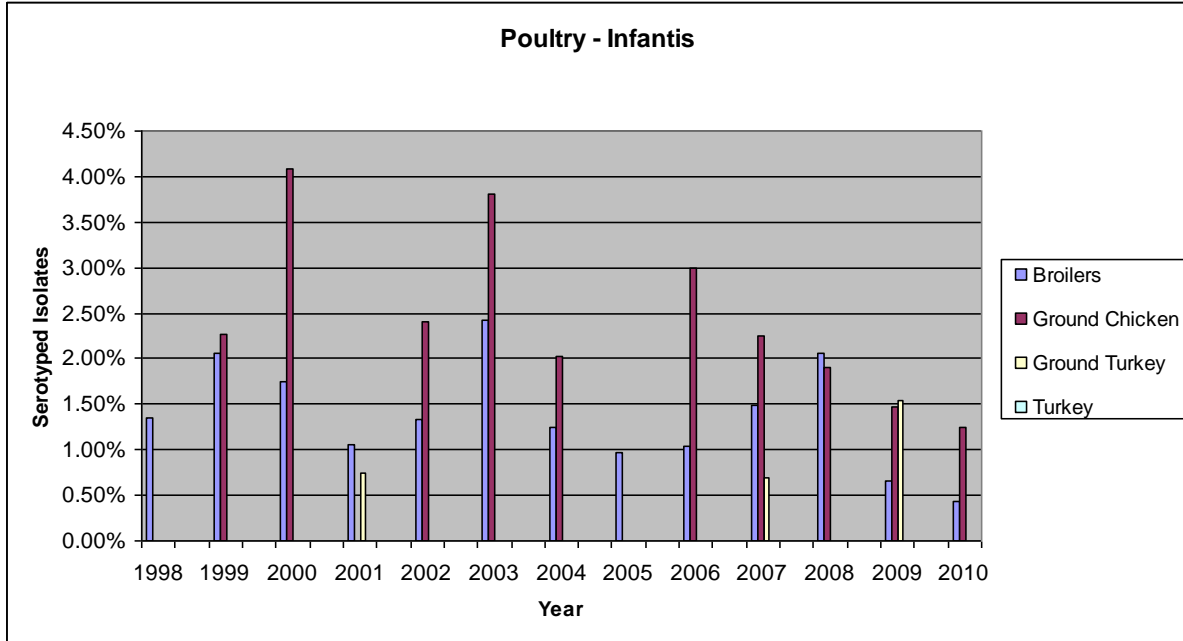
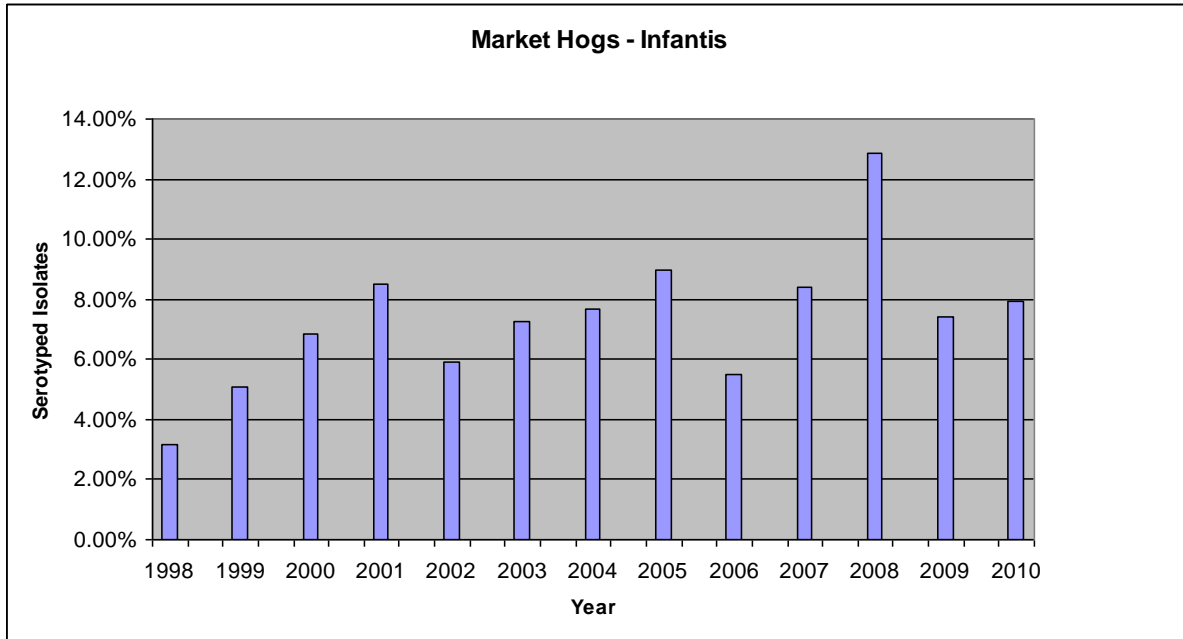




Figure 12 - Continued
Infantis—USDA, FSIS, PR/HACCP Verification Sampling by Calendar Year*
(1998–2005 “A” Set Samples; 2006–2010 All Samples)



*Please note that the y-axis percent varies from graph to graph.