



## Quarterly Results for Serotyping of Salmonellae from Meat and Poultry Products

January – December 2008

### Background

The Food Safety and Inspection Service (FSIS) issued the *Pathogen Reduction; Hazard Analysis and Critical Control Point (PR/HACCP) Systems, Final Rule* on July 25, 1996: Federal Register, Vol. 61, No. 144, pp. 38805-38989 (<http://www.fsis.usda.gov/OPPDE/rdad/FRPubs/93-016F.pdf>). The PR/HACCP rule sets *Salmonella* performance standards for establishments that slaughter or produce selected classes of food animals or raw ground products. Under PR/HACCP, performance standards were established for carcasses of cows/bulls, steers/heifers, market hogs, broilers, ground beef, ground chicken, and ground turkey based on nationwide microbiological baseline studies conducted before the rule was implemented. In June 2006, FSIS began sampling turkey carcasses for *Salmonella*. Guidance on standards for turkey carcasses can be found in the Federal Register, Vol.70, No. 32, pp.8058-8060 (<http://www.fsis.usda.gov/OPPDE/rdad/FRPubs/02-046N.pdf>).

Prior to 2006, there were two phases of the FSIS regulatory program for *Salmonella* in raw products: non-targeted and targeted testing. Non-targeted or "A" set samples were collected at establishments randomly selected from the population of eligible establishments with a goal of scheduling every eligible establishment at least once a year. Other codes (such as "B", "C", and "D") represented sample sets collected from establishments targeted for follow-up testing following a failed set. FSIS replaced the targeted/non-targeted approach with risk-based scheduling in 2006. The serotype data in this report are from all sample sets.

In February 2006, FSIS announced in the Federal Register, Vol. 71, No. 38, pp. 9772-9777, (<http://www.fsis.usda.gov/Frame/FrameRedirect.asp?main=http://www.fsis.usda.gov/OPPDE/rdad/FRPubs/04-026N.htm>) that quarterly results from *Salmonella* verification testing would be posted and that the Agency would provide individual test results to establishments before completion of a set. The Agency has published quarterly *Salmonella* results since 2006 ([http://www.fsis.usda.gov/Science/Q1\\_2008\\_Salmonella\\_Testing/index.asp](http://www.fsis.usda.gov/Science/Q1_2008_Salmonella_Testing/index.asp); [http://www.fsis.usda.gov/Science/Q2\\_2008\\_Salmonella\\_Testing/index.asp](http://www.fsis.usda.gov/Science/Q2_2008_Salmonella_Testing/index.asp); [http://www.fsis.usda.gov/Science/Q3\\_2008\\_Salmonella\\_Testing/index.asp](http://www.fsis.usda.gov/Science/Q3_2008_Salmonella_Testing/index.asp) [http://www.fsis.usda.gov/Science/Q4\\_2008\\_Salmonella\\_Testing/index.asp](http://www.fsis.usda.gov/Science/Q4_2008_Salmonella_Testing/index.asp)).

In June 2006, FSIS developed new criteria for scheduling establishments ([http://www.fsis.usda.gov/pdf/scheduling\\_criteria\\_salmonella\\_sets.pdf](http://www.fsis.usda.gov/pdf/scheduling_criteria_salmonella_sets.pdf)) that are risk-based and designed to focus FSIS resources on establishments that have the most samples positive for *Salmonella* and the greatest number of samples with serotypes most frequently associated with human salmonellosis as defined by the Centers for Disease Control and Prevention (CDC) (<http://www.cdc.gov/ncidod/dbmd/phlisdata/salmonella.htm>). Establishments are no longer randomly selected under the new criteria. One of the goals of the revised risk-based program is to identify the source of serotypes of the greatest human health concern and to report those findings directly to establishments. FSIS also now ensures that all pathogens of public health concern are identified regarding both their subtype (serotype and PFGE pattern) and their drug resistance profiles.



## Results

This report includes all four quarters of *Salmonella* serotype data for 2008. Data depicted represent samples collected from January 1 through December 31, 2008. The number of isolates of each serotype, the percent of isolates out of total positive, and the percent of isolates of total samples collected are displayed in Tables 1-32.

The ten most commonly isolated serotypes for each product class during each quarter are identified by name in each table. 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. The tables also include entries classified as “unidentified” isolates. A single, specific serotype could not be determined for these isolates.

Figures 1-8 display the percent of isolates identified out of total isolates serotyped for each product class by quarter from July 2005 forward for the top eight serotypes associated with human illness in 2007, <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5714a2.htm>. For consistency in the graphs, data collected prior to the 2006 revisions were updated to include results from all sets. In reviewing Figures 1-8, the y-axis, representing the serotype percentage, varies from graph to graph because the incidence of different serotypes by commodity varies greatly and year-to-year variations in percentages are difficult to discern on one scale of high value.

## Limitations

Restructuring how *Salmonella* sets are scheduled means that comparison of results from 2006 onwards to previous years will be less meaningful in terms of trends. Similarly, the changes to the verification program will prevent valid comparisons of testing results over time (e.g., quarter-to-quarter or year-to-year trends).



Table 1  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Broilers  
All Samples – 1<sup>st</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Enteritidis	31	22.63	2.21
Kentucky	26	18.98	1.85
Typhimurium (var. Copenhagen)	24	17.52	1.71
Heidelberg	23	16.79	1.64
Typhimurium	13	9.49	0.93
Thompson	4	2.92	0.29
4,5,12:i:-	3	2.19	0.21
Hadar	2	1.46	0.14
Montevideo	2	1.46	0.14
Schwarzengrund	2	1.46	0.14
Other serotypes	6	4.38	0.43
Unidentified	1	0.73	0.07
Total positive	137		9.76
Total number of analyzed samples	1403		



Table 2  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Market Hogs  
All Samples – 1<sup>st</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Derby	8	26.67	0.90
Typhimurium (var. Copenhagen)	4	13.33	0.45
Agona	3	10.00	0.34
Infantis	2	6.67	0.23
London	2	6.67	0.23
Anatum	1	3.33	0.11
Cerro	1	3.33	0.11
Hadar	1	3.33	0.11
Javiana	1	3.33	0.11
Johannesburg	1	3.33	0.11
Kentucky	1	3.33	0.11
Muenchen	1	3.33	0.11
Newport	1	3.33	0.11
Saint-Paul	1	3.33	0.11
Typhimurium	1	3.33	0.11
Worthington	1	3.33	0.11
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	30		3.39
Total number of analyzed samples	884		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 3  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Cows/Bulls  
All Samples – 1<sup>st</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Cerro	1	100.00	0.28
Other serotypes	0	0.00	0.00
Total positive	1		0.28
Total number of analyzed samples	355		



Table 4  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Steers/Heifers  
All Samples – 1<sup>st</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Dublin	1	100.00	0.10
Other serotypes	0	0.00	0.00
Total positive	1		0.10
Total number of analyzed samples	990		



Table 5  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Beef  
All Samples – 1<sup>st</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Montevideo	12	19.05	0.38
Dublin	11	17.46	0.34
Cerro	7	11.11	0.22
Mbandaka	7	11.11	0.22
Anatum	5	7.94	0.16
Typhimurium	4	6.35	0.13
Give	3	4.76	0.09
Muenster	3	4.76	0.09
Bareilly	2	3.17	0.06
Kentucky	2	3.17	0.06
Other serotypes	6	9.52	0.19
Unidentified	1	1.59	0.03
Total positive	63		1.97
Total number of analyzed samples	3193		



Table 6  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Chicken  
All Samples – 1<sup>st</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Heidelberg	20	44.44	14.08
Enteritidis	7	15.56	4.93
Kentucky	7	15.56	4.93
Typhimurium	2	4.44	1.41
4,12:i:-	1	2.22	0.70
4,5,12:i:-	1	2.22	0.70
6,7:-:1,5	1	2.22	0.70
Blockley	1	2.22	0.70
Braenderup	1	2.22	0.70
Hartford	1	2.22	0.70
Infantis	1	2.22	0.70
Montevideo	1	2.22	0.70
Oranienburg	1	2.22	0.70
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	45		31.69
Total number of analyzed samples	142		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.





Table 7  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Turkey  
All Samples – 1<sup>st</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Hadar	13	25.49	4.08
Saint-Paul	8	15.69	2.51
Schwarzengrund	5	9.80	1.57
Newport	4	7.84	1.25
Berta	3	5.88	0.94
Heidelberg	3	5.88	0.94
Muenster	3	5.88	0.94
Worthington	3	5.88	0.94
4,5,12:r:-	1	1.96	0.31
Anatum	1	1.96	0.31
Kentucky	1	1.96	0.31
Mbandaka	1	1.96	0.31
Minnesota	1	1.96	0.31
Montevideo	1	1.96	0.31
Ohio	1	1.96	0.31
Senftenberg	1	1.96	0.31
Tennessee	1	1.96	0.31
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	51		15.99
Total number of analyzed samples	319		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 8  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Turkeys  
All Samples – 1<sup>st</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Hadar	2	28.57	2.13
Agona	1	14.29	1.06
Berta	1	14.29	1.06
Brandenburg	1	14.29	1.06
Newport	1	14.29	1.06
Schwarzengrund	1	14.29	1.06
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	7		7.45
Total number of analyzed samples	94		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 9  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Broilers  
All Samples –2<sup>nd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Kentucky	64	47.06	2.72
Enteritidis	23	16.91	0.98
Heidelberg	21	15.44	0.89
4,5,12:i:-	7	5.15	0.30
4,12:i:-	3	2.21	0.13
Berta	2	1.47	0.08
Schwarzengrund	2	1.47	0.08
Typhimurium	2	1.47	0.08
Typhimurium (var. Copenhagen)	2	1.47	0.08
4,12,:r:-	1	0.74	0.04
8,20:-z6	1	0.74	0.04
Anatum	1	0.74	0.04
Braenderup	1	0.74	0.04
Infantis	1	0.74	0.04
Litchfield	1	0.74	0.04
Montevideo	1	0.74	0.04
Newport	1	0.74	0.04
Unidentified	2	1.47	0.08
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	136		5.77
Total number of analyzed samples	2356		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding



Table 10  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Market Hogs  
All Samples –2<sup>nd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Infantis	6	14.63	0.42
Derby	5	12.20	0.35
London	4	9.76	0.28
Saint-Paul	3	7.32	0.21
Agona	2	4.88	0.14
Brandenburg	2	4.88	0.14
Johannesburg	2	4.88	0.14
Muenster	2	4.88	0.14
Ohio	2	4.88	0.14
Typhimurium	2	4.88	0.14
Uganda	2	4.88	0.14
Unidentified	0	0.00	0.00
Other serotypes	9	21.95	0.63
<sup>a</sup> Total positive	41		2.89
Total number of analyzed samples	1418		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 11  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Cows/Bulls  
All Samples –2<sup>nd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Cerro	2	66.67	0.28
Montevideo	1	33.33	0.14
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	3		0.41
Total number of analyzed samples	726		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 12  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Steers/Heifers  
All Samples –2<sup>nd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Typhimurium (var. Copenhagen)	1	50.00	0.09
Other serotypes	0	0.00	0.00
Unidentified	1	50.00	0.09
<sup>a</sup> Total positive	2		0.19
Total number of analyzed samples	1056		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 13  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Beef  
All Samples –2<sup>nd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Montevideo	31	19.02	0.43
Dublin	20	12.27	0.28
Newport	14	8.59	0.19
Typhimurium	12	7.36	0.17
Anatum	11	6.75	0.15
Kentucky	11	6.75	0.15
Meleagridis	9	5.52	0.12
Agona	8	4.91	0.11
Muenster	8	4.91	0.11
Mbandaka	7	4.29	0.10
Other serotypes	28	17.18	0.39
Unidentified	4	2.45	0.06
<sup>a</sup> Total positive	163		2.25
Total number of analyzed samples	7248		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 14  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Chicken  
All Samples –2<sup>nd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Kentucky	5	21.74	3.88
Typhimurium (var. Copenhagen)	5	21.74	3.88
Enteritidis	4	17.39	3.10
Heidelberg	3	13.04	2.33
Typhimurium	2	8.70	1.55
4,5,12:i:-	1	4.35	0.78
Berta	1	4.35	0.78
Infantis	1	4.35	0.78
Kralingen	1	4.35	0.78
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	23		17.83
Total number of analyzed samples	129		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.





Table 15  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Turkey  
All Samples –2<sup>nd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Hadar	7	19.44	3.14
Muenchen	4	11.11	1.79
Senftenberg	4	11.11	1.79
Agona	3	8.33	1.35
Heidelberg	3	8.33	1.35
Saint-Paul	3	8.33	1.35
Schwarzengrund	3	8.33	1.35
Worthington	2	5.56	0.90
4,12:1,v:-	1	2.78	0.45
III 18:z4,z32:-	1	2.78	0.45
Albany	1	2.78	0.45
Cubana	1	2.78	0.45
Newport	1	2.78	0.45
Typhimurium	1	2.78	0.45
Other serotypes	0	0.00	0.00
Unidentified	1	2.78	0.45
<sup>a</sup> Total positive	36		16.14
Total number of analyzed samples	223		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 16  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Turkeys  
All Samples –2<sup>nd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
	0	0.00	0.00
Other serotypes	0	0.00	0.00
Total positive	0		0.00
Total number of analyzed samples	21		



Table 17  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Broilers  
All Samples – 3<sup>rd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Kentucky	73	50.69	4.00
Enteritidis	24	16.67	1.31
Heidelberg	13	9.03	0.71
Infantis	8	5.56	0.44
Senftenberg	4	2.78	0.22
Typhimurium	4	2.78	0.22
Montevideo	3	2.08	0.16
Livingston	2	1.39	0.11
Schwarzengrund	2	1.39	0.11
4,5,12:-:1	1	0.69	0.05
4,5,12:i:-	1	0.69	0.05
8,20:-:z6	1	0.69	0.05
Blockley	1	0.69	0.05
Hadar	1	0.69	0.05
Litchfield	1	0.69	0.05
Mbandaka	1	0.69	0.05
Thompson	1	0.69	0.05
Westhampton	1	0.69	0.05
Other serotypes	0	0.00	0.00
Unidentified	2	1.39	0.11
<sup>a</sup> Total positive	144		7.89
Total number of analyzed samples	1826		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 18  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Market Hogs  
All Samples – 3<sup>rd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Infantis	4	17.39	0.34
Anatum	3	13.04	0.25
Saint-Paul	3	13.04	0.25
Derby	2	8.70	0.17
Johannesburg	2	8.70	0.17
Agona	1	4.35	0.08
Bredeney	1	4.35	0.08
Hadar	1	4.35	0.08
Heidelberg	1	4.35	0.08
Mbandaka	1	4.35	0.08
Newport	1	4.35	0.08
Ohio	1	4.35	0.08
Schwarzengrund	1	4.35	0.08
Typhimurium	1	4.35	0.08
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	23		1.95
Total number of analyzed samples	1177		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 19  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Cows/Bulls  
All Samples – 3<sup>rd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Agona	2	33.33	0.25
Anatum var 15+	1	16.67	0.13
Hadar	1	16.67	0.13
Muenster	1	16.67	0.13
Newport	1	16.67	0.13
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	6		0.75
Total number of analyzed samples	798		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 20  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Steers/Heifers  
All Samples – 3<sup>rd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Anatum	1	33.33	0.06
Montevideo	1	33.33	0.06
Typhimurium	1	33.33	0.06
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	3		0.19
Total number of analyzed samples	1546		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 21  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Beef  
All Samples – 3<sup>rd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Montevideo	37	32.74	0.95
Newport	11	9.73	0.28
Cerro	8	7.08	0.21
Dublin	7	6.19	0.18
Agona	6	5.31	0.15
Anatum	5	4.42	0.13
Kentucky	4	3.54	0.10
Mbandaka	3	2.65	0.08
Oranienburg	3	2.65	0.08
Senftenberg	3	2.65	0.08
Typhimurium (var. Copenhagen)	3	2.65	0.08
Other serotypes	21	18.58	0.54
Unidentified	2	1.77	0.05
<sup>a</sup> Total positive	113		2.90
Total number of analyzed samples	3894		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 22  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Chicken  
All Samples – 3<sup>rd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Kentucky	13	81.25	15.66
Enteritidis	2	12.50	2.41
Typhimurium	1	6.25	1.20
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	16		19.28
Total number of analyzed samples		83	

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.





Table 23  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Turkey  
All Samples – 3<sup>rd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
III 18:z4,z32:-	9	33.33	5.08
Hadar	9	33.33	5.08
Agona	2	7.41	1.13
Saint-Paul	2	7.41	1.13
Albany	1	3.70	0.56
Muenchen	1	3.70	0.56
Newport	1	3.70	0.56
Thompson	1	3.70	0.56
Typhimurium	1	3.70	0.56
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	27		15.25
Total number of analyzed samples	177		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 24  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Turkeys  
All Samples – 3<sup>rd</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Hadar	1	100.00	8.33
Other serotypes	0	0.00	0.00
Total positive	1		8.33
Total number of analyzed samples	12		



Table 25  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Broilers  
All Samples – 4<sup>th</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Kentucky	16	23.19	1.62
Enteritidis	11	15.94	1.11
Typhimurium (var. Copenhagen)	9	13.04	0.91
Heidelberg	6	8.70	0.61
4,5,12:i:-	5	7.25	0.51
Montevideo	4	5.80	0.40
Berta	2	2.90	0.20
Typhimurium	2	2.90	0.20
Worthington	2	2.90	0.20
6,7:1,w	1	1.45	0.10
8,20:i:-	1	1.45	0.10
Dublin	1	1.45	0.10
Glostrup	1	1.45	0.10
Infantis	1	1.45	0.10
Kiambu	1	1.45	0.10
Ohio	1	1.45	0.10
Paratyphi B var. L-tartrate+	1	1.45	0.10
Pomona	1	1.45	0.10
Putten	1	1.45	0.10
Schwarzengrund	1	1.45	0.10
Senftenberg	1	1.45	0.10
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	69		6.98
Total number of analyzed samples	989		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 26  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Market Hogs  
All Samples – 4<sup>th</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Derby	8	53.33	1.05
Infantis	2	13.33	0.26
Senftenberg	2	13.33	0.26
Typhimurium (var. Copenhagen)	2	13.33	0.26
Ohio	1	6.67	0.13
Other serotypes	0	0.00	0.00
Total positive	15		1.96
Total number of analyzed samples	765		



Table 27  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Cows/Bulls  
All Samples – 4<sup>th</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Kentucky	1	50.00	0.24
London	1	50.00	0.24
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	2		0.47
Total number of analyzed samples	422		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 28  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Steers/Heifers  
All Samples – 4<sup>th</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Dublin	1	33.33	0.07
Mbandaka	1	33.33	0.07
Newport	1	33.33	0.07
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	3		0.22
Total number of analyzed samples	1373		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 29  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Beef  
All Samples – 4<sup>th</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Montevideo	20	28.99	0.82
Dublin	12	17.39	0.49
Meleagridis	6	8.70	0.25
Typhimurium	5	7.25	0.21
Anatum	4	5.80	0.16
Newport	4	5.80	0.16
Muenster	3	4.35	0.12
Infantis	2	2.90	0.08
Reading	2	2.90	0.08
Uganda var. 15+	2	2.90	0.08
Other serotypes	8	11.59	0.33
Unidentified	1	1.45	0.04
<sup>a</sup> Total positive	69		2.84
Total number of analyzed samples	2430		

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.



Table 30  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Chicken  
All Samples – 4<sup>th</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Enteritidis	8	38.10	13.79
Kentucky	5	23.81	8.62
Heidelberg	3	14.29	5.17
4,5,12:r:-	1	4.76	1.72
8,20:-:z6	1	4.76	1.72
Montevideo	1	4.76	1.72
Typhimurium	1	4.76	1.72
Typhimurium (var. Copenhagen)	1	4.76	1.72
Other serotypes	0	0.00	0.00
<sup>a</sup> Total positive	21		36.21
Total number of analyzed samples		58	

<sup>a</sup> The percentages listed for total positive isolates may not equal the sum of % analyzed samples due to rounding.





Table 31  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Ground Turkey  
All Samples – 4<sup>th</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
Hadar	6	28.57	3.82
III 18:z4,z32:-	5	23.81	3.18
Albany	2	9.52	1.27
Saint-Paul	2	9.52	1.27
3,10:e,h:-	1	4.76	0.64
4,12:d:-	1	4.76	0.64
Enteritidis	1	4.76	0.64
Muenster	1	4.76	0.64
Newport	1	4.76	0.64
Senftenberg	1	4.76	0.64
Other serotypes	0	0.00	0.00
Total positive	21		13.38
Total number of analyzed samples	157		

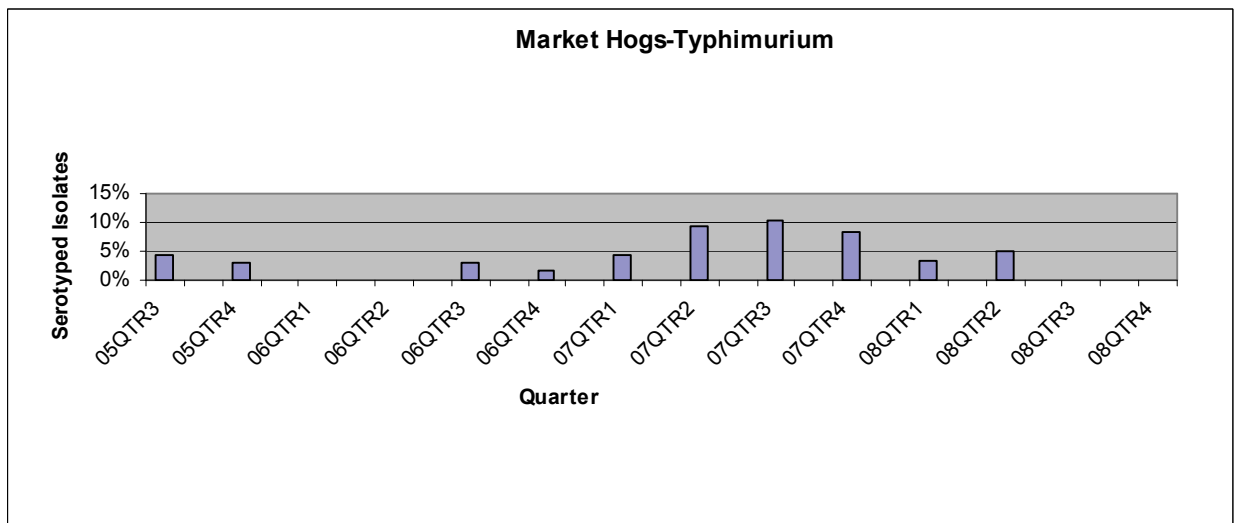
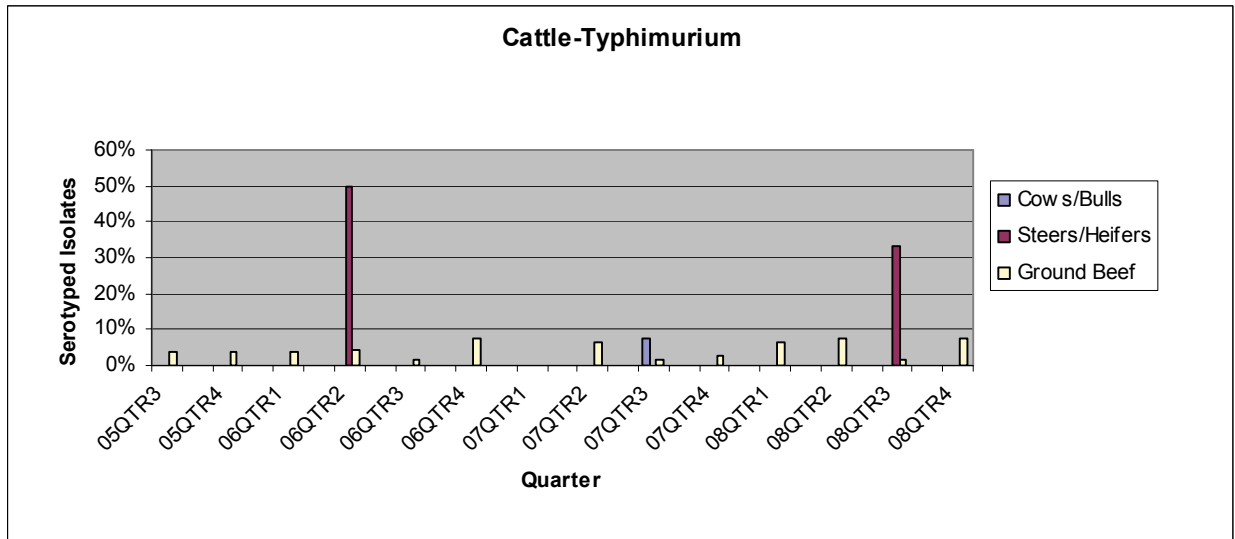
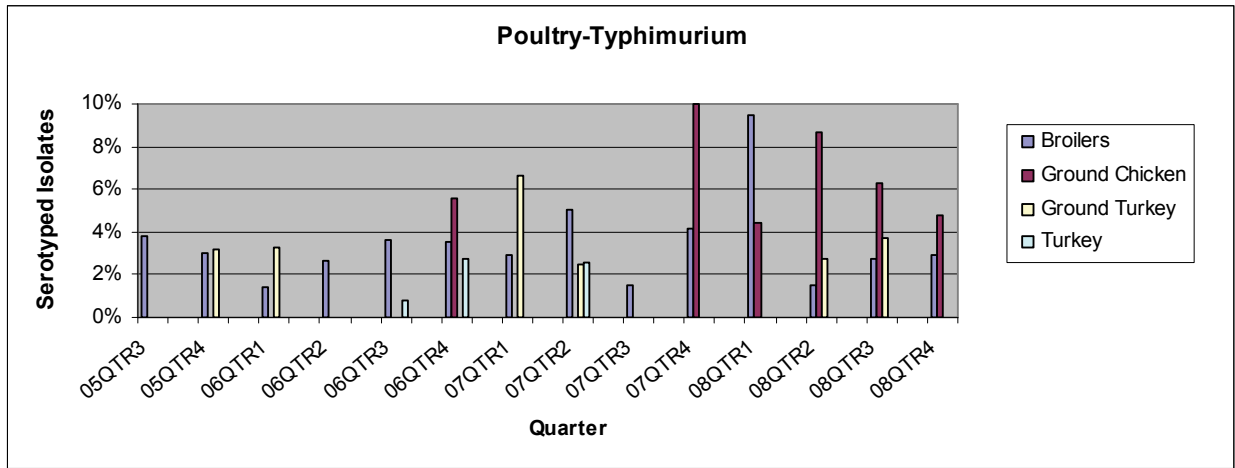


Table 32  
Serotypes Profile of Analyzed PR/HACCP Verification Samples by Quarter.  
Turkeys  
All Samples – 4<sup>th</sup> Quarter 2008

Serotypes	# Isolates	% of Total Positive	% Analyzed Samples
	0	0.00	0.00
Other serotypes	0	0.00	0.00
Total positive	0		0.00
Total number of analyzed samples	3		



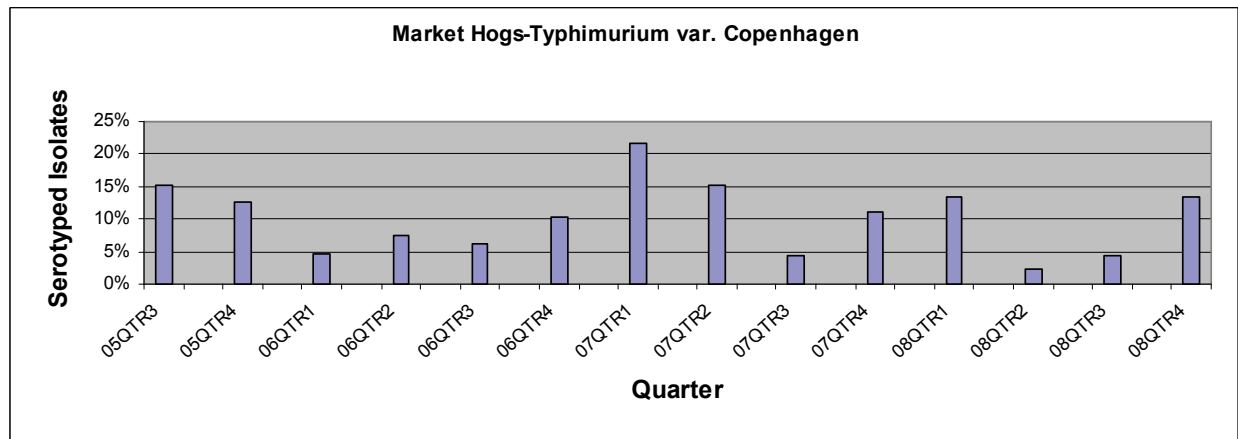
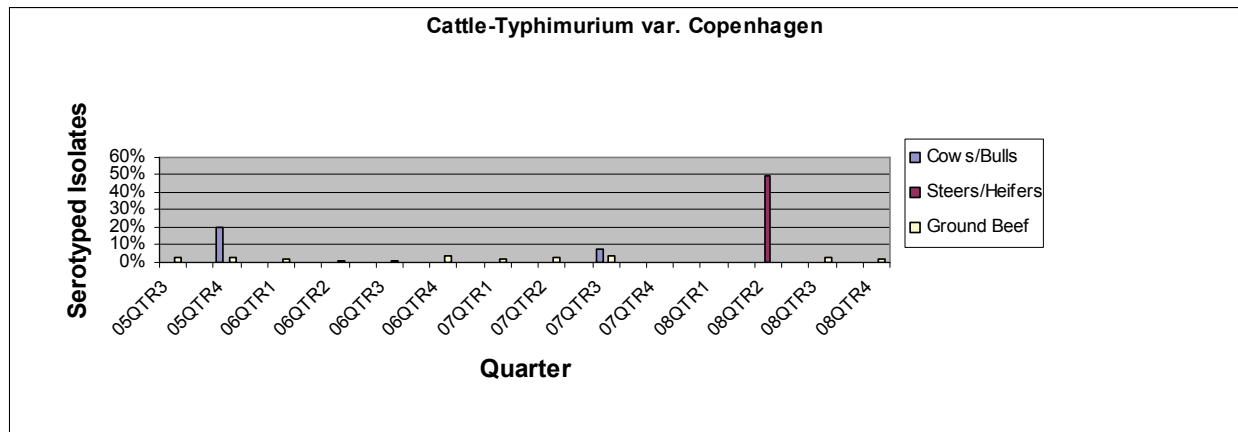
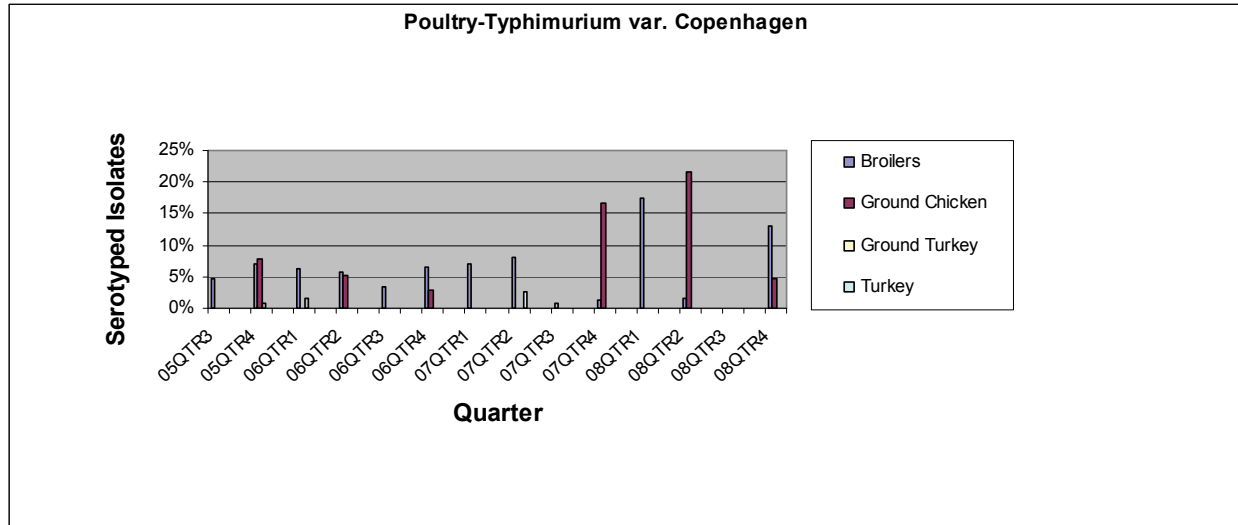
Figure 1  
Typhimurium – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



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



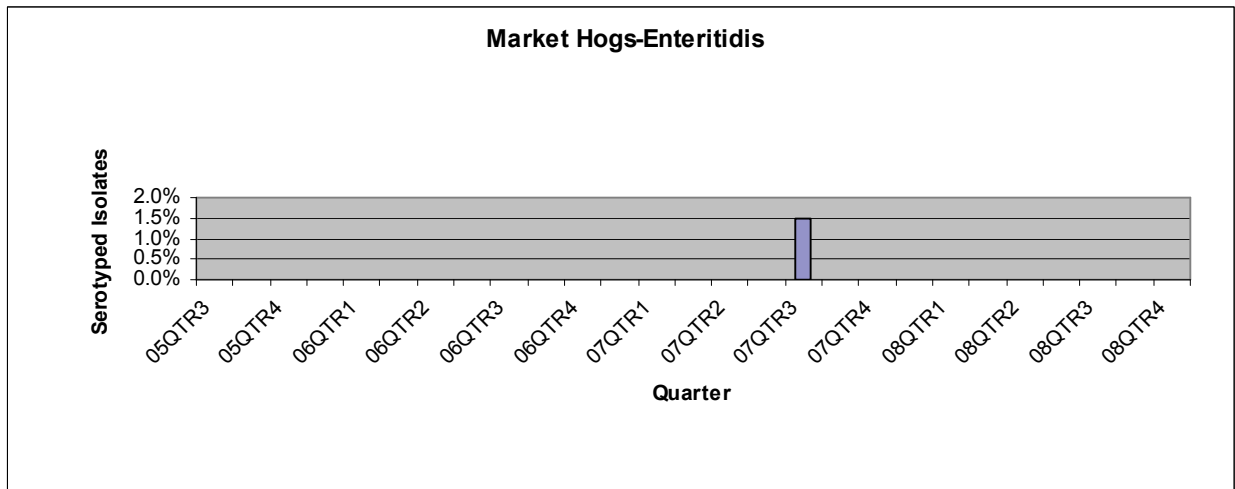
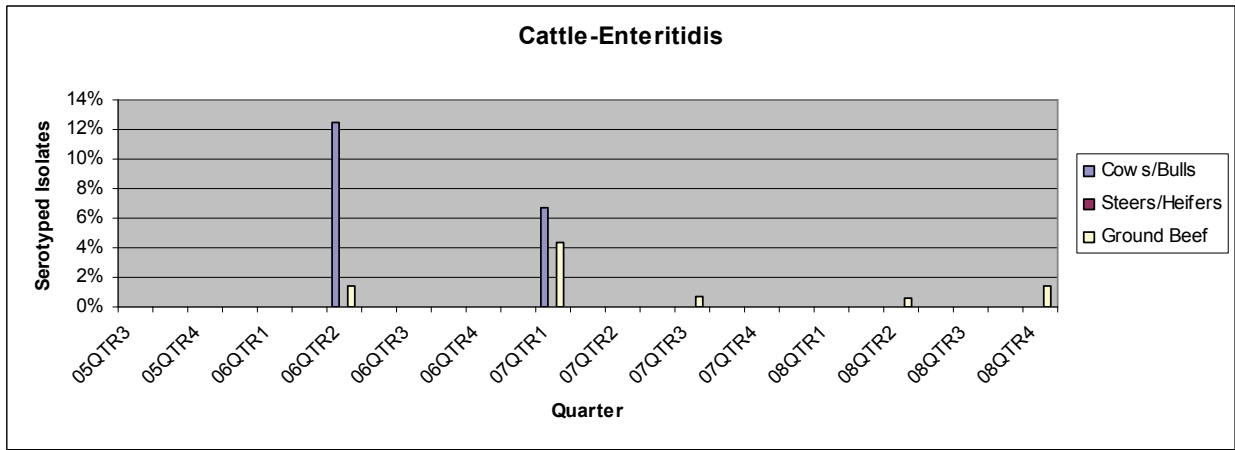
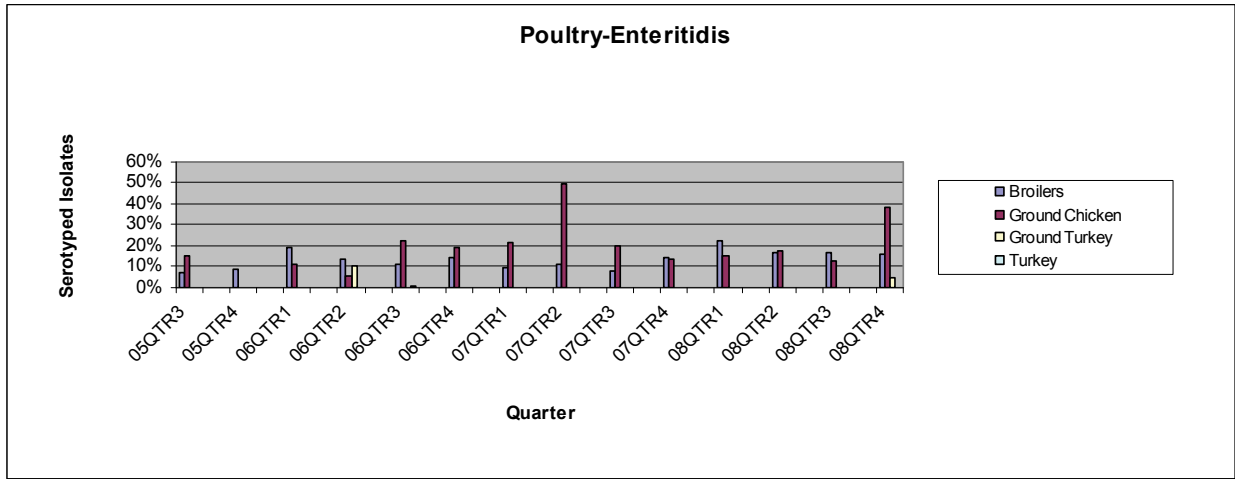
Figure 2  
Typhimurium var. Copenhagen – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



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



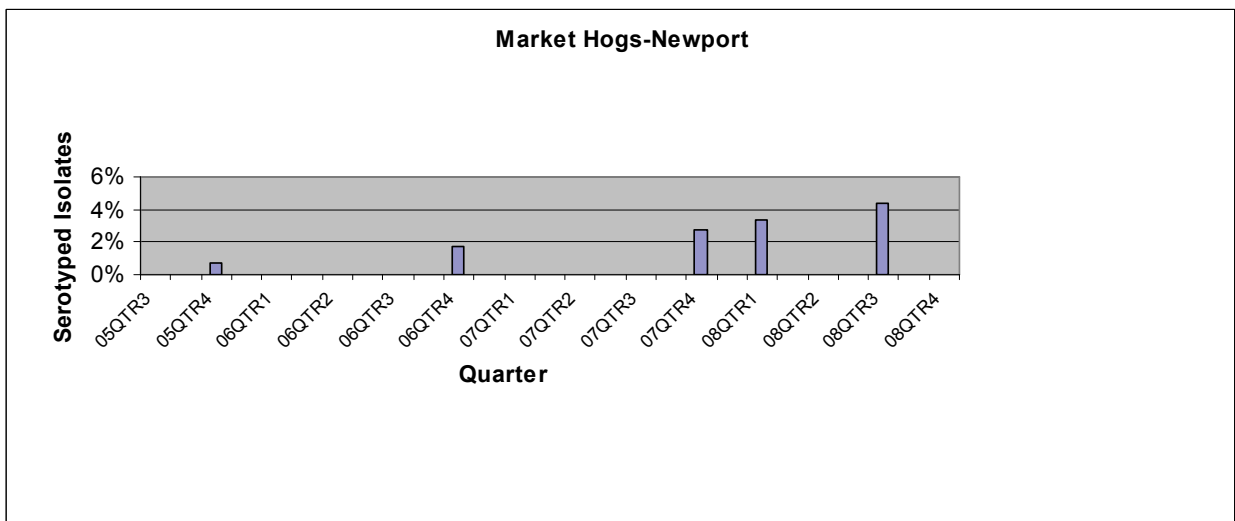
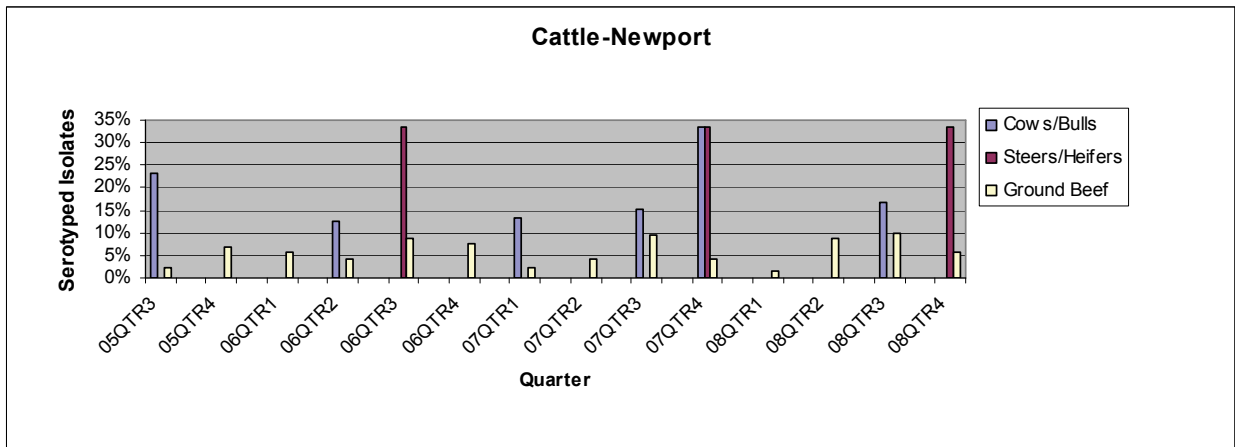
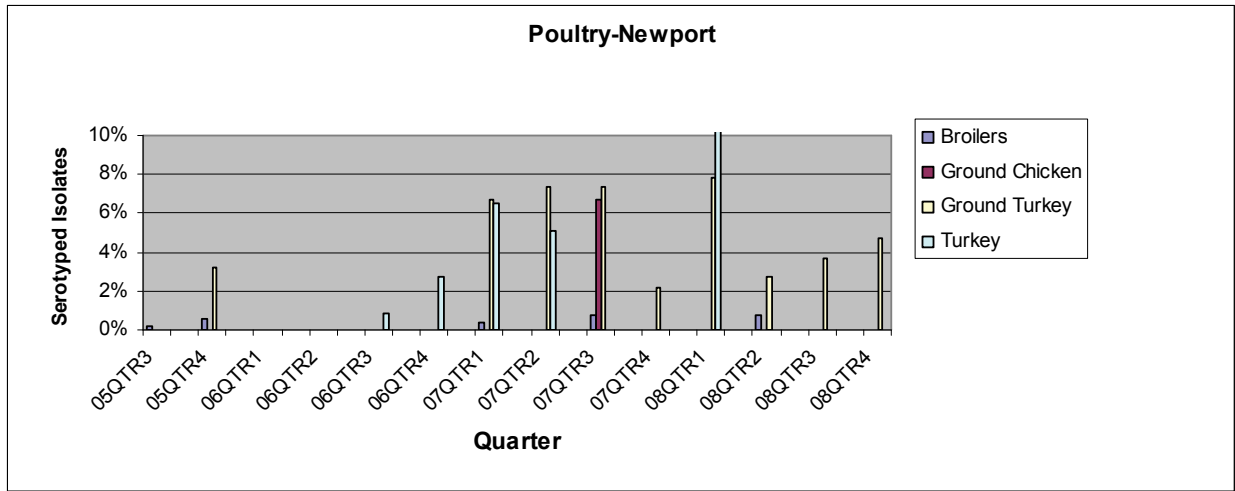
Figure 3  
Enteritidis – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



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



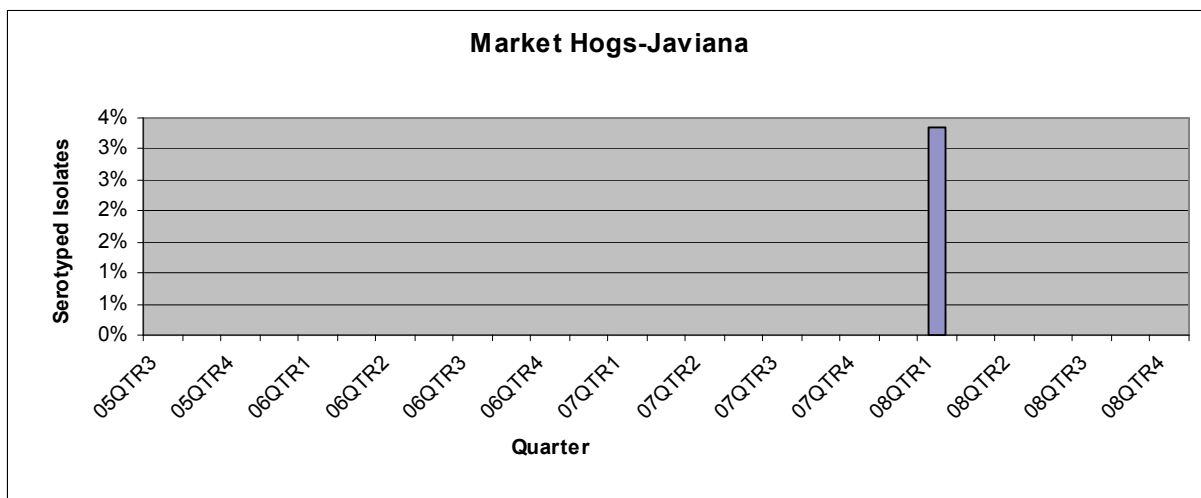
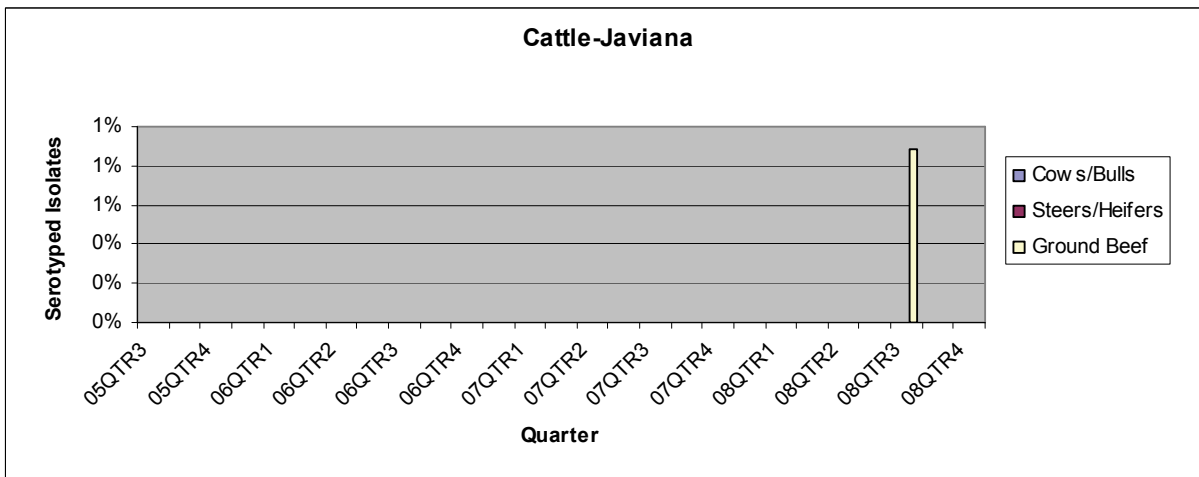
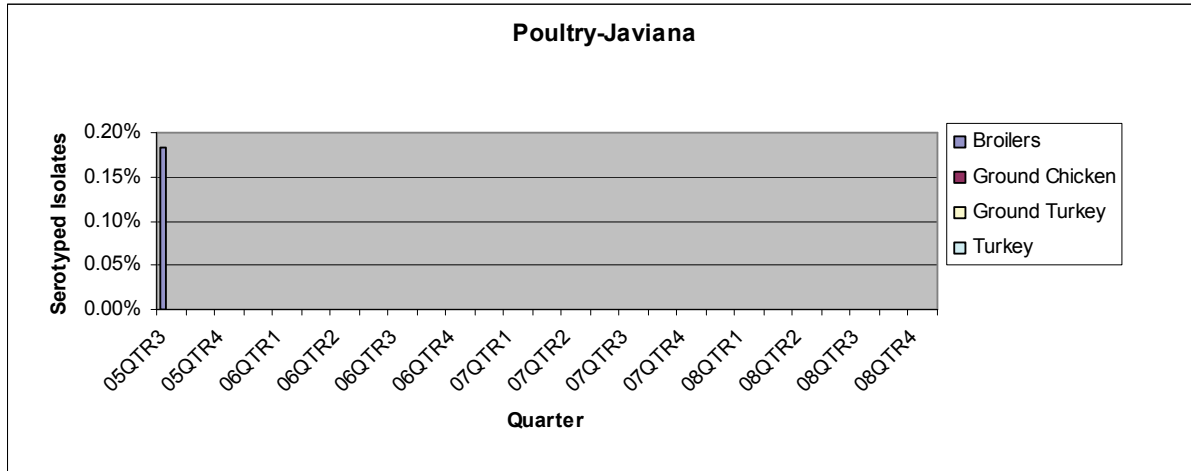
Figure 4  
Newport – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



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



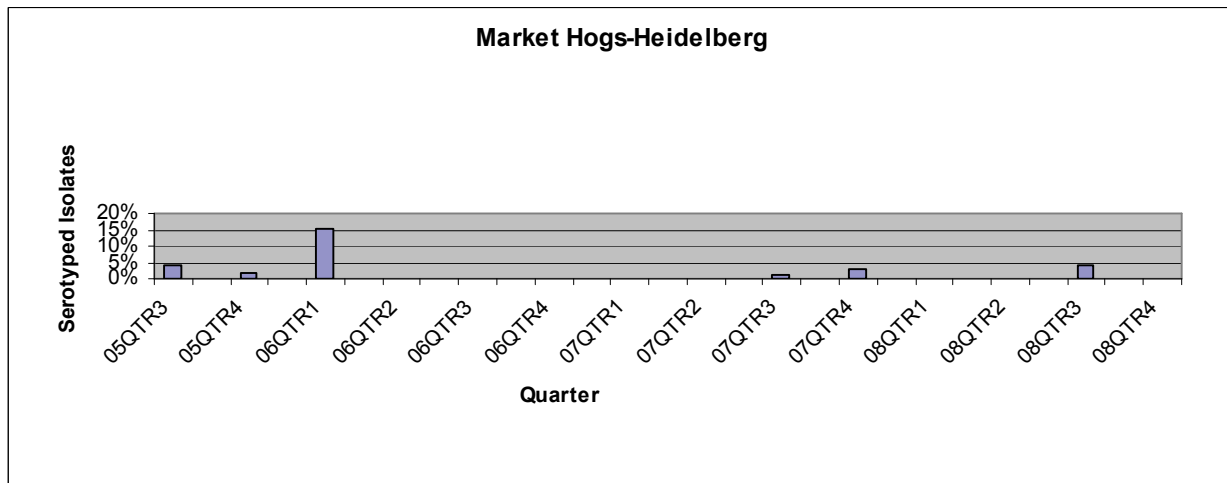
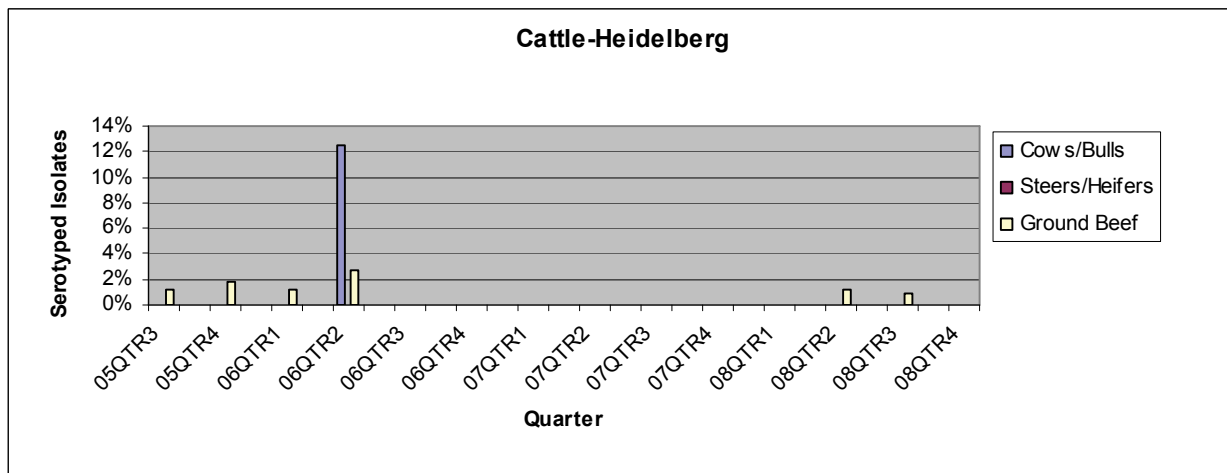
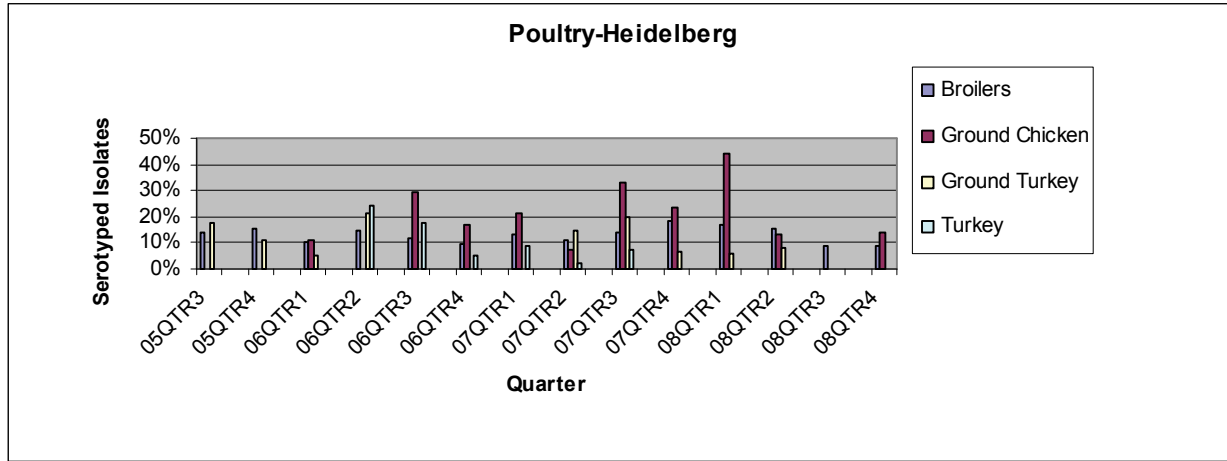
Figure 5  
Javiana – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



\*Please note that the y-axis % varies from graph to graph



Figure 6  
Heidelberg – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples

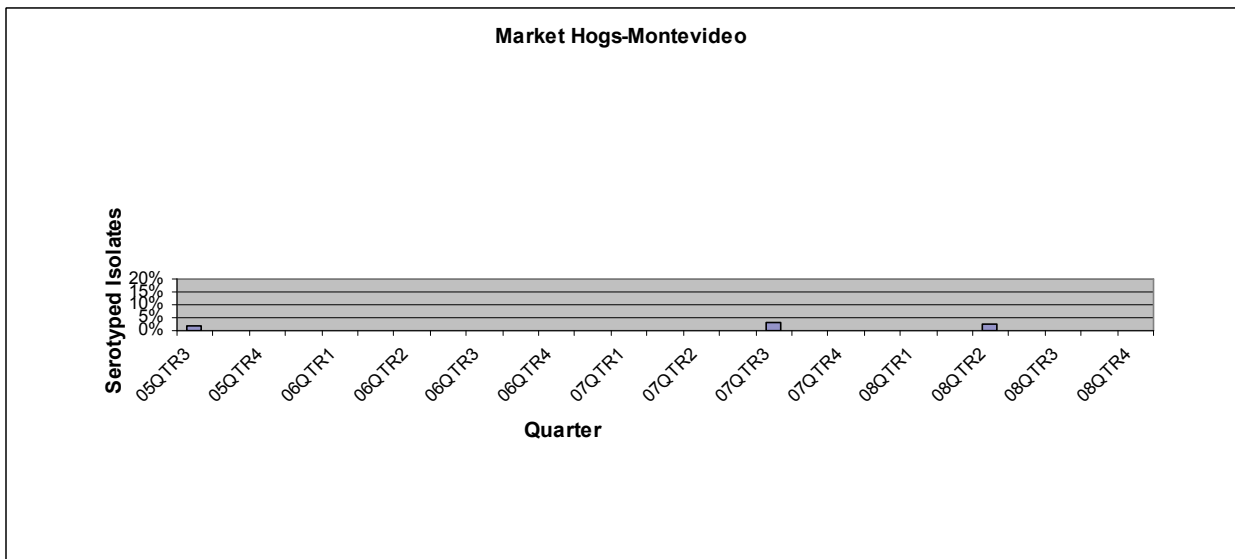
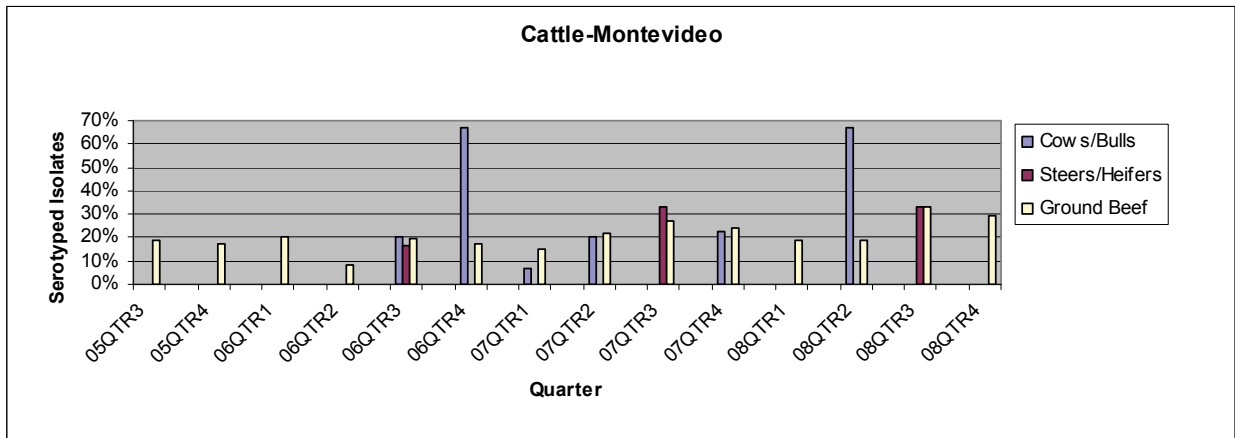
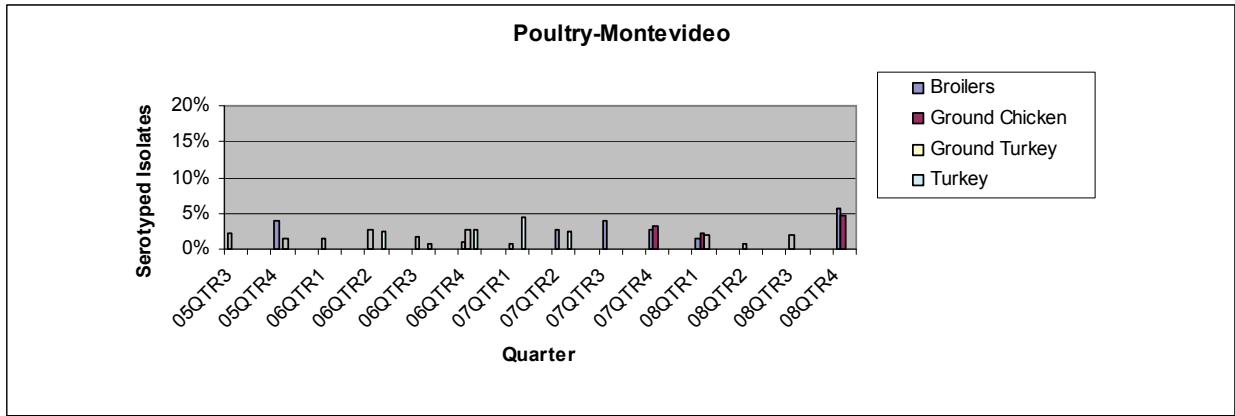


\*Please note that the y-axis % varies from graph to graph.





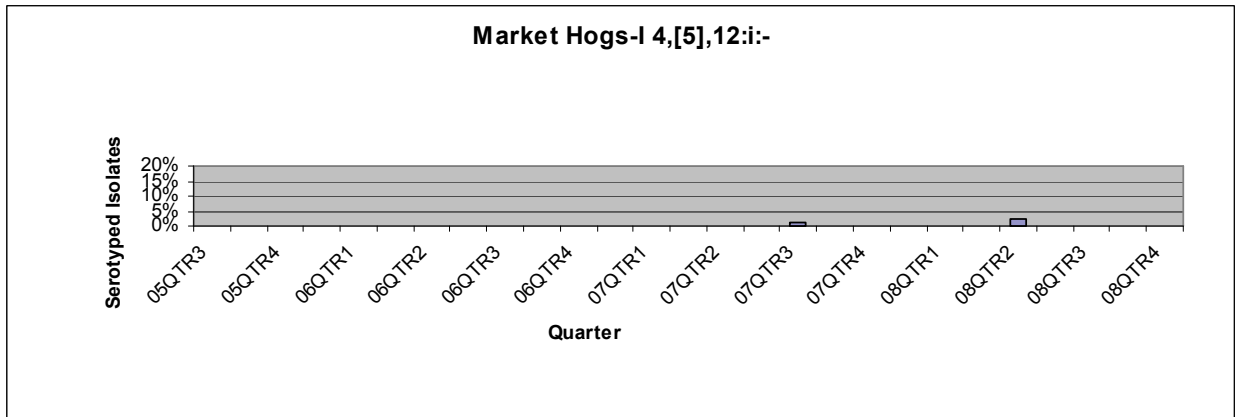
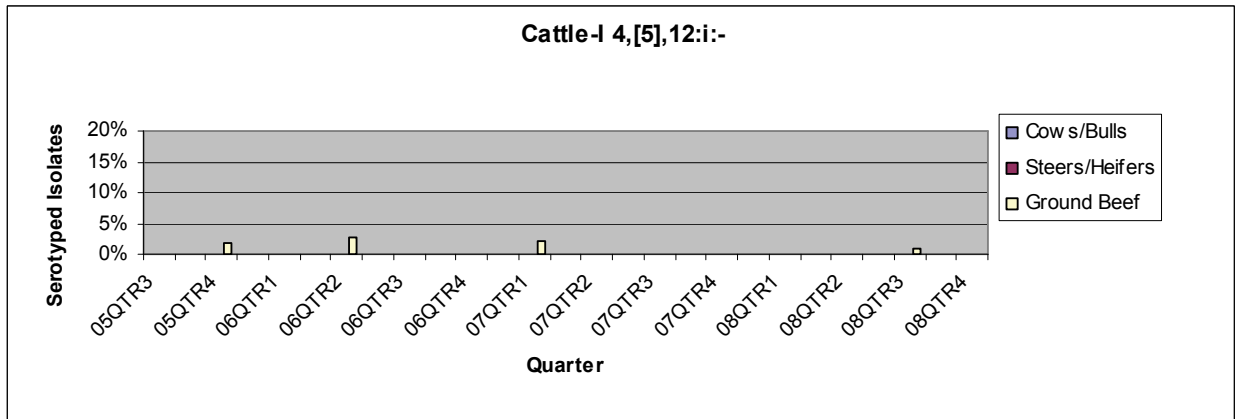
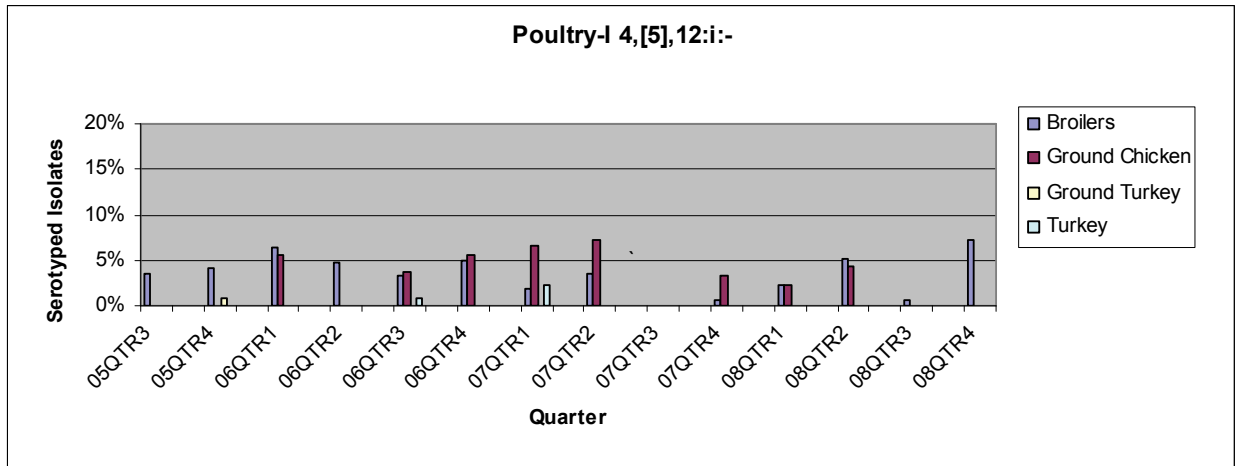
Figure 7  
Montevideo – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



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



Figure 8  
I 4,[5],12:1:- – USDA, FSIS, PR/HACCP Verification Sampling by Quarter\*  
All Samples



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