# **Breakpoints**

Table 1. Interpretive Criteria Used for Susceptibility Testing of Salmonella and E. coli

Table 1. Interpretive Cri	teria Used for Susceptibility	resting or 3	aiiiiOiieiia ai	ia E. Coli
		Br	eakpoints (µg/r	nl)
Antimicrobial Class	Antimicrobial Agent	Susceptible	Intermediate	Resistant
Aminoglycosides	Gentamicin	≤ 4	8	≥ 16
	Kanamycin	≤ 16	32	≥ 64
	Streptomycin	≤ 32	N/A	≥ 64
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin–Clavulanic Acid	≤ 8 / 4	16 / 8	≥ 32 / 16
Cephems	Cefoxitin	≤ 8	16	≥ 32
	Ceftiofur	≤ 2	4	≥ 8
	Ceftriaxone	≤ 1	2	≥ 4
Folate Pathway Inhibitors	Sulfamethoxazole/Sulfisoxazole <sup>2</sup>	≤ 256	N/A	≥ 512
	Trimethoprim-Sulfamethoxazole	≤ 2 / 38	N/A	≥ 4 / 76
Macrolides	Azithromycin	≤ 16	N/A	≥ 32
Penicillins	Ampicillin	≤ 8	16	≥ 32
Phenicols	Chloramphenicol	≤ 8	16	≥ 32
Quinolones	Ciprofloxacin <sup>3</sup>	≤ 0.06	0.12-0.5	≥1
	Nalidixic acid	≤ 16	N/A	≥ 32
Tetracyclines	Tetracycline	≤ 4	8	≥ 16

<sup>&</sup>lt;sup>1</sup> Breakpoints were adopted from CLSI (Clinical and Laboratory Standards Institute) M100-S22 document, except for streptomycin and azithromycin, which has no CLSI breakpoints

 $<sup>^{2}</sup>$  Sulfamethoxazole was tested from 1996 through 2003 and was replaced by sulfisoxazole in 2004  $\,$ 

<sup>&</sup>lt;sup>3</sup> Revised ciprofloxacin breakpoints for invasive *Salmonella* serotypes from the CLSI M100-S22 document were used for all *Salmonella* and *E. coli* analyses

Table 2. Interpretive Criteria Used for Susceptibility Testing of Campylobacter <sup>1</sup>

			Breakpoir	nts (µg/ml)	
		C. je	juni	C. (	coli
Antimicrobial Class	Antimicrobial Agent	Susceptible	Resistant	Susceptible	Resistant
Aminoglycosides	Gentamicin	≤ 2	≥ 4	≤ 2	≥ 4
Ketolides	Telithromycin	≤ 4	≥ 8	≤ 4	≥ 8
Lincosamides	Clindamycin	≤ 0.5	≥ 1	≤ 1	≥ 2
Macrolides	Azithromycin	≤0.25	≥ 0.5	≤ 0.5	≥ 1
	Erythromycin	≤ 4	≥ 8	≤ 8	≥ 16
Phenicols	Chloramphenicol	≤ 16	≥ 32	≤ 16	≥ 32
	Florfenicol	≤ 4	≥ 8	≤ 4	≥ 8
Quinolones	Ciprofloxacin	≤ 0.5	≥ 1	≤ 0.5	≥ 1
	Nalidixic acid	≤ 16	≥ 32	≤ 16	≥ 32
Tetracyclines	Doxycycline	≤ 0.5	≥ 1	≤ 1	≥ 2
	Tetracycline	≤ 1	≥ 2	≤ 2	≥ 4

<sup>&</sup>lt;sup>1</sup>Breakpoints were adopted from epidemiological cut off values

Table 3. Interpretive Criteria Used for Susceptibility Testing of Enterococcus <sup>1</sup>

		Br	nl)	
Antimicrobial Class	Antimicrobial Agent	Susceptible	Intermediate	Resistant
Aminoglycosides	Gentamicin	≤ 500	N/A	>500
	Kanamycin <sup>2</sup>	≤ 512	N/A	≥ 1024
	Streptomycin	≤ 512	N/A	≥ 1024
Glycopeptides	Vancomycin	≤ 4	8 -16	≥ 32
Glycylcycline	Tigecycline <sup>2,3</sup>	≤ 0.25	N/A	N/A
Lincosamides	Lincomycin <sup>2</sup>	≤ 2	4	≥ 8
Lipopeptides	Daptomycin <sup>4</sup>	≤ 4	N/A	N/A
Macrolides	Erythromycin	≤ 0.5	1 - 4	≥ 8
	Tylosin <sup>2</sup>	≤ 8	16	≥ 32
Nitrofurans	Nitrofurantoin	≤ 32	64	≥ 128
Oxazolidinones	Linezolid	≤ 2	4	≥ 8
Penicillins	Penicillin	≤ 8	N/A	≥ 16
Phenicols	Chloramphenicol	≤ 8	16	≥ 32
Quinolone	Ciprofloxacin	≤ 1	2	≥ 4
Streptogramins	Quinupristin/Dalfopristin	≤ 1	2	≥ 4
Tetracyclines	Tetracycline	≤ 4	8	≥ 16

Table 4. Interpretive Criteria Used for Susceptibility Testing of *Salmonella* and *E. coli* Resistant to Ceftriaxone or Ceftiofur<sup>1</sup>

		Breakpoints (µg/ml)							
Antimicrobial Class	Antimicrobial Agent	Susceptible	Intermediate	Resistant					
β-Lactam/β-Lactamase Inhibitor Combinations	Piperacillin-tazobactam	≤ 16	32 - 64	≥ 128					
Penems	Imipenem	≤ 1	2	≥ 4					
Cephems	Cefepime <sup>5</sup>	≤ 2	4 - 8	≥ 16					
	Cefotaxime	≤ 1	2	≥ 4					
	Ceftazidime	≤ 4	8	≥ 16					
Monobactams	Aztreonam	≤ 4	8	≥ 16					

<sup>&</sup>lt;sup>1</sup> Breakpoints were adopted from CLSI (Clinical and Laboratory Standards Institute) M100-S22 document, where available

 $<sup>^{2}\,\</sup>mbox{No CLSI}$  interpretive criteria for this bacterium/antimicrobial combination currently available

 $<sup>^3</sup>$  Only a susceptible breakpoint (≤0.25 µg/ml) has been established. Isolates with an MIC ≥0.5 µg/ml are reported as resistant

 $<sup>^4</sup>$  Only a susceptible breakpoint (≤4 μg/ml) has been established for *E. faecalis* . Isolates with an MIC ≥8 μg/ml are reported as resistant. There are no established CLSI breakpoints for *E. faecium* and *E. hirae* 

<sup>&</sup>lt;sup>5</sup> Cefepime MICs above the susceptible range and below the resistant range are Susceptible Dose Dependent (SDD) according to the CLSI guidelines in the M100-S24 document

## Non-Typhoidal Salmonella Data

## Non-Typhoidal Salmonella Isolates Tested

Table 5. Number of Non-Typhoidal Salmonella Isolates Tested, 1996-2013<sup>1</sup>

	0										Year								
	Source	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Humans	1318	1297	1454	1493	1372	1409	1998	1855	1782	2036	2171	2145	2384	2193	2449	2335	2233	2178
sus	Retail Chickens							60	83	157	153	152	99	198	272	171	158	229	208
icke	HACCP		214	561	1438	1173	1307	1500	1158	1280	1989	1380	994	624	551	564	491	864	520
ر د	Cecal																		55
ys	Retail Ground Turkey							74	114	142	183	159	190	246	193	202	162	91	106
ırkey	HACCP		107	240	713	518	550	244	262	236	227	304	271	148	121	151	103	175	87
1	Cecal																		28
	Retail Ground Beef							9	10	14	8	19	13	24	14	7	9	13	15
ttle	HACCP Cecal (Beef)		24	284	1610	1388	893	1008	670	607	329	389	439	443	200	247	340	280	310
ဒီ	Cecal (Beef)																		124
	Cecal (Dairy)																		310
	Retail Pork Chops							10	5	11	9	8	18	23	8	20	28	12	24
ine	HACCP <sup>2</sup> Cecal (Market Hogs)		111	793	876	451	418	379	211	308	301	304	211	111	120	111	90		
SW	Cecal (Market Hogs)																		260
	Cecal (Sows)																		289

<sup>&</sup>lt;sup>1</sup> NARMS reports for the years 1996-2006 combined data for all non-Typhi *Salmonella* isolates from humans. Beginning in 2007, NARMS reported data separately for all typhoidal *Salmonella* serotypes (i.e. Typhi, Paratyphi A, tartrate-negative Paratyphi B, and Paratyphi C). This report includes data only for non-typhoidal isolates from humans. Data for typhoidal *Salmonella* can be found in the NARMS Human Isolates Final Reports, published by CDC.

<sup>&</sup>lt;sup>2</sup> In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

# Isolation of Non-Typhoidal Salmonella from Retail Meats

Table 6. Number and Percent of Retail Meat Samples Culture Positive for Salmonella, 2012

	Retail Chickens	Retail Ground Turkey	Retail Ground Beef	Retail Pork Chops
Number of Meat Samples Tested	1300	1295	1300	1300
Number Positive for Salmonella	229	91	13	12
Percent Positive for Salmonella	17.6%	7.0%	1.0%	0.9%

Figure 1. Percent of Retail Meat Samples Culture Positive for Salmonella, 2012

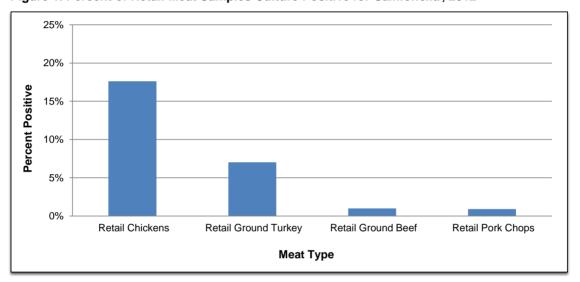
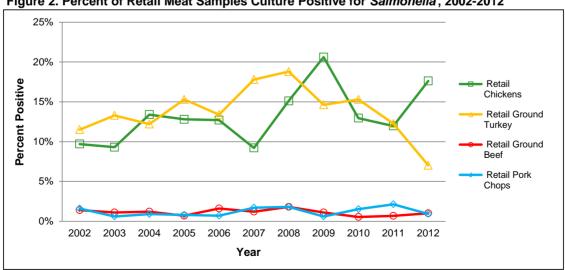


Figure 2. Percent of Retail Meat Samples Culture Positive for Salmonella, 2002-2012



# Isolation of Non-Typhoidal Salmonella from Retail Meats

Table 7. Number and Percent of Retail Meat Samples Culture Positive for Salmonella, 2013

	Retail Chickens	Retail Ground Turkey	Retail Ground Beef	Retail Pork Chops
Number of Meat Samples Tested	1669	1644	1663	1670
Number Positive for Salmonella	208	106	15	24
Percent Positive for Salmonella	12.5%	6.4%	0.9%	1.4%

Figure 3. Percent of Retail Meat Samples Culture Positive for Salmonella, 2013

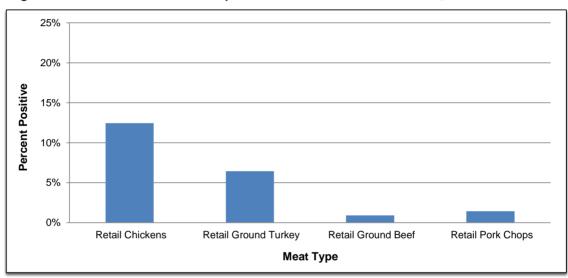


Figure 4. Percent of Retail Meat Samples Culture Positive for Salmonella, 2002-2013

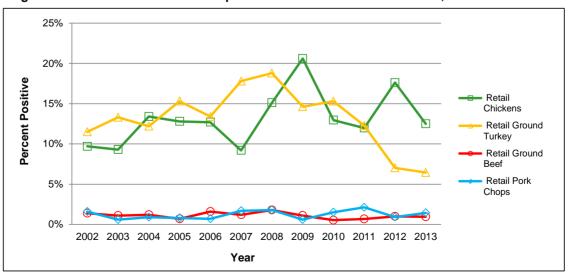


Table 8. Top Serotypes among Non-Typhoidal Salmonella Isolates, 2012

	Humans						Chic	kens			
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Humans	Enteritidis	364	16.3	Retail	Typhimurium	88	38.4		Kentucky	301	34.8
(N=2233)	Typhimurium	296	13.3	Chickens	Kentucky	62	27.1	HACCP	Enteritidis	203	23.5
,	Newport	258	11.6	(N=229)	Enteritidis	26	11.4	(N=864)	Typhimurium	105	12.2
	Javiana	134	6.0		Heidelberg	17	7.4		Heidelberg	81	9.4
	I 4,[5],12:i:-	117	5.2		Thompson	11	4.8		Infantis	31	3.6
	Infantis	90	4.0		I 4,[5],12:i:-	6	2.6		Thompson	30	3.5
	Montevideo	60	2.7		Mbandaka	4	1.7		Schwarzengrund	26	3.0
	Muenchen	58	2.6		Montevideo	4	1.7		Other	87	10.1
	Oranienburg	50	2.2		Infantis	3	1.3		Otrici	01	10.1
	Saintpaul	50	2.2		Braenderup	2	0.9				
	Bareilly	49	2.2		Other	6	2.6				
	Braenderup	48	2.1		Other	O	2.0				
	Heidelberg	41	1.8				Tur	keys			
	Thompson	34	1.5	Source	Serotype	n	%	Source	Serotype	n	%
	Mississippi	27	1.2		Co.o.ypc		,,,	00000	СС.С.УРС		,,,
	Paratyphi B var. L(+) tartrate+	27	1.2	D-4-II	IIIa 18:z4,z23:-	16	17.6		Hadar	31	17.7
	Schwarzengrund	23	1.0	Retail Ground	Saintpaul	9	9.9	HACCP	Heidelberg	19	10.9
	· ·	20	0.9	Turkey	Typhimurium	9	9.9	(N=175)	Albany	15	8.6
	Agona Hadar	18	0.8	(N=91)	Hadar	8	8.8		Saintpaul	11	6.3
	Litchfield	17	0.8		Agona	7	7.7		Schwarzengrund	11	6.3
	Poona	17	0.8		Schwarzengrund	7	7.7		Senftenberg	11	6.3
	Unknown serotype	19	0.9		Heidelberg	5	5.5		Agona	10	5.7
	Partially serotyped	26	1.2		Enteritidis	4	4.4		Muenchen	10	5.7
	Rough/Nonmotile isolates	7	0.3		Reading	4	4.4		Other	57	32.5
	Other	383	17.2		Infantis	3	3.3		<b>5</b>	0.	02.0
	Other	000			Albany	2	2.2				
					Anatum	2	2.2				
					Brandenburg	2	2.2				
					Newport	2	2.2				
					Senftenberg	2	2.2				
					Other	9	9.9				
							Ca	ttle			
				Source	Serotype	n	%	Source	Serotype	n	%
				Retail	Dublin	4	30.8	НАССР	Montevideo	84	30.0
				Ground	Cerro	2	15.4	(N=280)	Dublin	30	10.7
				Beef	Agona	1	7.7	(** ===,	Anatum	18	6.4
				(N=13)	Anatum	1	7.7		Typhimurium	16	5.7
					Infantis	1	7.7		Cerro	14	5.0
					Kentucky	1	7.7		Muenchen	13	4.6
					Montevideo	1	7.7		Kentucky	12	4.3
					Newport	1	7.7		Meleagridis	12	4.3
					Typhimurium	1	7.7		Muenster	7	2.5
								I	Mbandaka	5	1.8
										3	
									Newport	5	1.8
									Newport Other		1.8 22.9
							-		·	5	
								rine	Other	5 64	22.9
				Source	Serotype	n	Sw %	rine Source	·	5	
							%	1	Other	5 64	22.9
				Retail	Typhimurium	6	50.0	Source	Other	5 64	22.9
				Retail Pork	Typhimurium Derby	6 1	% 50.0 8.3	1	Other	5 64	22.9
				Retail Pork Chops	Typhimurium Derby Heidelberg	6 1 1	% 50.0 8.3 8.3	Source HACCP <sup>1</sup>	Other	5 64	22.9
				Retail Pork	Typhimurium Derby Heidelberg Infantis	6 1 1 1	% 50.0 8.3 8.3 8.3	Source HACCP <sup>1</sup>	Other	5 64	22.9
				Retail Pork Chops	Typhimurium Derby Heidelberg Infantis Kentucky	6 1 1 1	% 50.0 8.3 8.3 8.3 8.3	Source HACCP <sup>1</sup>	Other	5 64	22.9
				Retail Pork Chops	Typhimurium Derby Heidelberg Infantis Kentucky London	6 1 1 1 1	% 50.0 8.3 8.3 8.3 8.3 8.3	Source HACCP <sup>1</sup>	Other	5 64	22.9
				Retail Pork Chops	Typhimurium Derby Heidelberg Infantis Kentucky	6 1 1 1	% 50.0 8.3 8.3 8.3 8.3	Source HACCP <sup>1</sup>	Other	5 64	22.9

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample pork products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

Table 9. Top Serotypes among Non-Typhoidal Salmonella Isolates, 2013

Table 9.	Top Serotypes among N	on-Typ	hoida	l Salmonella I	solates, 2013				Chickons						
Source	Humans Serotype	n	%	Source	Serotype	n	%	Source	Chickens Serotype	n	%	Source	Serotype	n	%
Humans (N=2178)	Enteritidis	382	17.5	Retail	Typhimurium	68	32.7	HACCP	Kentucky	237	45.6	Cecal	Kentucky	15	27.3
(N=2176)	Typhimurium Newport	325 209	14.9 9.6	Chickens (N=208)	Kentucky Heidelberg	44 28	21.2 13.5	(N=520)	Enteritidis Typhimurium	79 55	15.2 10.6	(N=55)	Typhimurium Heidelberg	15 9	27.3 16.4
	Javiana	140	6.4		Enteritidis	25	12.0		Infantis	35	6.7		Enteritidis	6	10.9
	I 4,[5],12:i:-	127	5.8		Schwarzengrund	11	5.3		Heidelberg	29	5.6		I 8,20:-:z6	2	3.6
	Infantis	76	3.5		Infantis	8	3.8		Schwarzengrund	21	4.0		Ouakam	2	3.6
	Heidelberg Muenchen	60 59	2.8		I 4,[5],12:i:-	3	1.4		I 4,[5],12:i:- Other	21 43	4.0 8.3		Senftenberg Other	2 4	3.6 7.3
	Saintpaul	56	2.6		Mbandaka Thompson	3	1.4		Other	43	0.3		Otner	4	1.3
	Montevideo	53	2.4		Worthington	3	1.4								
	Braenderup	44	2.0		Other	12	5.8								
	Mississippi	36	1.7												
	Oranienburg Thompson	34 33	1.6 1.5	Source	Caratima	n	%	Causas	Turkeys Serotype		%	Source	Caratima		%
	Agona	28	1.3	Source	Serotype		/0	Source	Serotype	n	/0	Source	Serotype	n	/0
	Paratyphi B var. L(+) tartrate+	28	1.3	Retail	Saintpaul	20	18.9	114 OOD	Hadar	12	13.8	01	Albany	5	17.9
	Anatum	20	0.9	Ground Turkey	Heidelberg	17	16.0	HACCP (N=87)	Reading	10	11.5	Cecal (N=28)	Hadar	4	14.3
	Bareilly	19	0.9	(N=106)	Hadar	14	13.2		Muenchen	8	9.2		Reading	3	10.7
	Poona Berta	17 16	0.8		Muenchen I 4,[5],12:i:-	13 6	12.3 5.7		I 4,[5],12:i:- Heidelberg	6 6	6.9 6.9		Saintpaul Senftenberg	3	10.7 10.7
	Unknown serotype	36	1.7		Reading	5	4.7		Berta	6	6.9		Heidelberg	2	7.1
	Partially serotyped	13	0.6		Albany	4	3.8		Typhimurium	5	5.7		Schwarzengrund	2	7.1
	Rough/Nonmotile isolates	6	0.3		Agona	3	2.8		Albany	5	5.7		Typhimurium	2	7.1
	Other	361	16.6		Litchfield Schwarzengrund	3	2.8		Other	29	33.3		Agona Enteritidis	1	3.6 3.6
					Other	18	17.0						Indiana	1	3.6
													Kentucky	1	3.6
									6 "1						
				Source	Serotype	n	%	Source	Cattle Serotype	n	%	Source	Serotype	n	%
				000.00	Соголуро		70	Course	остолуро	•	70	GGarac	Ослохуро	-	,,,
				Retail	Dublin	4	26.7	НАССР	Montevideo	89	28.7	Cecal	Montevideo	21	16.9
				Ground Beef (N=15)	Montevideo	4	26.7	(N=310)	Typhimurium	23	7.4	(Beef) (N=124)	Anatum	18	14.5
				()	Infantis Anatum	2	13.3 6.7		Meleagridis Dublin	22 21	7.1 6.8	(	Typhimurium Meleagridis	14 9	11.3 7.3
					Heidelberg	1	6.7		Anatum	16	5.2		Newport	8	6.5
					Kentucky	1	6.7		Kentucky	14	4.5		Cerro	6	4.8
					Mbandaka	1	6.7		Muenchen	13	4.2		Kentucky	6	4.8
					Muenster	1	6.7		Newport	13	4.2		Muenchen	4	3.2
									Cerro Infantis	12 7	3.9 2.2		Muenster Uganda	4	3.2
									Panama	7	2.2		Agona	3	2.4
									Other	73	23.5		Lille	3	2.4
													Mbandaka	3	2.4
													Senftenberg Other	3 18	2.4
													Otner	10	14.5
												Cecal	Cerro	92	29.7
												(Dairy)	Montevideo	56	18.1
												(N=310)	Typhimurium	21	6.8
													Anatum	18	5.8
													Meleagridis Muenster	17 16	5.5 5.2
													Kentucky	15	4.8
													Muenchen	9	2.9
													Newport	7	2.3
												<u></u>	Other	59	19.0
				Cause	Caratur		0/	Par	Swine		0/	Paus	Paratur -		9/
				Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
				Retail	Derby	5	20.8	HACCP <sup>1</sup>				Cecal	Derby	38	14.6
				Pork Chops	Typhimurium	4	16.7	(N=0)				(Market Hogs) (N=260)	Anatum	33	12.7
				(N=24)	Johannesburg I 4,[5],12:i:-	3 2	12.5 8.3						Johannesburg Typhimurium	21 21	8.1 8.1
					Heidelberg	2	8.3						Infantis	20	7.7
					Muenchen	2	8.3						Agona	12	4.6
					Saintpaul	2	8.3						Uganda	11	4.2
					Bredeney	1	4.2						Cerro	10	3.8
					Infantis Liverpool	1	4.2 4.2						Muenchen Meleagridis	9	3.5 2.3
					Ohio	1	4.2						Meleagridis Senftenberg	6	2.3
													Other	73	28.1
				ĺ								Cecal	Anatum	43	14.9
				ĺ								(Sows) (N=289)	Johannesburg	33	11.4
				ĺ								(14=203)	Infantis Derby	27 24	9.3 8.3
													Derby Uganda	22	8.3 7.6
I													Muenchen	14	4.8
													Meleagridis	12	4.2
													Adelaide	11	3.8
													Agona Saintpaul	11 10	3.8
													Agona Saintpaul Cerro	11 10 8	3.8 3.5 2.8
													Saintpaul	10 8 6	3.5 2.8 2.1
													Saintpaul Cerro	10 8	3.5 2.8

<sup>1</sup> In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

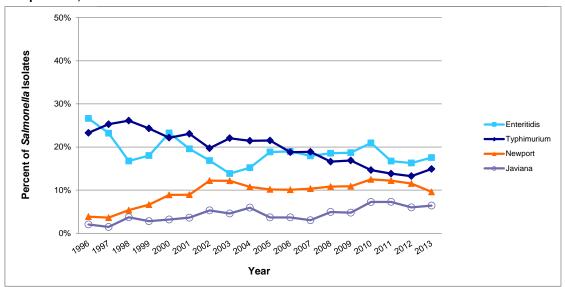
Table 10. Top Non-Typhoidal *Salmonella* Serotypes in Humans and their Distributions among Retail Meat and Food Animal Isolates, 2012

	Humans	Chic	kens	Turke	eys	Catt	le	Swine
	Humans (N=2233)	Retail Chickens (N=229)	HACCP (N=864)	Retail Ground Turkey (N=91)	HACCP (N=175)	Retail Ground Beef (N=13)	HACCP (N=280)	Retail Pork Chops (N=12)
1. Enteritidis	16.3%	11.4%	23.5%	4.4%	0.6%	0.0%	0.4%	0.0%
1. Litteritials	364	26	203	4	1	0	1	0
2. Typhimurium	13.3%	38.4%	12.2%	9.9%	2.3%	7.7%	5.7%	50.0%
z. rypillillurium	296	88	105	9	4	1	16	6
3. Newport	11.6%	0.4%	0.2%	2.2%	2.3%	7.7%	1.8%	0.0%
3. Newport	258	1	2	2	4	1	5	0
4 leviene	6.0%	0.0%	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%
4. Javiana	134	0	0	1	0	0	0	0
E 14 [5] 40-i-	5.2%	2.6%	2.0%	0.0%	0.6%	0.0%	1.1%	0.0%
5. I 4,[5],12:i:-	117	6	17	0	1	0	3	0
C. Infantia	4.0%	1.3%	3.6%	3.3%	0.0%	7.7%	1.4%	8.3%
6. Infantis	90	3	31	3	0	1	4	1
7 Mantaridas	2.7%	1.7%	1.0%	1.1%	2.9%	7.7%	30.0%	0.0%
7. Montevideo	60	4	9	1	5	1	84	0
<b>. M</b>	2.6%	0.0%	0.1%	1.1%	5.7%	0.0%	4.6%	0.0%
8. Muenchen	58	0	1	1	10	0	13	0
	2.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.4%	0.0%
9. Oranienburg	50	0	1	0	0	0	1	0
	2.2%	0.0%	0.0%	9.9%	6.3%	0.0%	0.0%	0.0%
10. Saintpaul	50	0	0	9	11	0	0	0

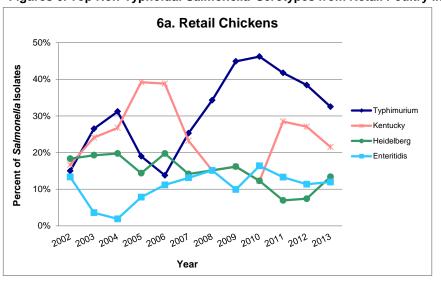
Table 11. Top Non-Typhoidal Salmonella Serotypes in Humans and their Distributions among Retail Meat and Food Animal Isolates, 2013

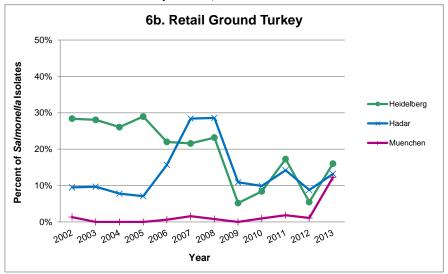
	Humans		Chickens			Turkeys			Ca	ttle		Swine				
	Humans (N=2178)	Retail Chickens (N=210)	HACCP (N=520)	Cecal (N=55)	Retail Ground Turkeys (N=106)	HACCP (N=87)	Cecal (N=28)	Retail Ground Beef (N=16)	HACCP (N=310)	Cecal (Beef) (N=124)	Cecal (Dairy) (N=310)	Retail Pork Chops (N=24)	Cecal (Market Hogs) (N=260)	Cecal (Sows) (N=289)		
1. Enteritidis	17.5%	12.0%	15.2%	10.9%	1.9%	1.1%	3.6%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%		
	382	25	79	6	2	1	1	0	1	0	0	0	0	1		
2. Typhimuriurm	14.9%	32.7%	10.6%	27.3%	0.9%	5.7%	7.1%	0.0%	7.4%	11.3%	6.8%	16.7%	8.1%	1.4%		
	325	68	55	15	1	5	2	0	23	14	21	4	21	4		
3. Newport	9.6%	1.0%	0.4%	0.0%	0.0%	4.6%	0.0%	0.0%	4.2%	6.5%	2.3%	0.0%	1.2%	1.4%		
o. Newport	209	2	2	0	0	4	0	0	13	8	7	0	3	4		
4 Javiana	6.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%		
4. Javiana	140	0	0	0	0	0	0	0	0	0	0	0	1	0		
5. I 4,[5],12:i:-	5.8%	1.4%	4.0%	0.0%	5.7%	6.9%	0.0%	0.0%	1.6%	0.0%	0.3%	8.3%	1.5%	1.0%		
J. 1 4,[J], 12.1	127	3	21	0	6	6	0	0	5	0	1	2	4	3		
6. Infantis	3.5%	3.8%	6.7%	1.8%	1.9%	0.0%	0.0%	12.5%	2.3%	0.8%	1.0%	4.2%	7.7%	9.3%		
o. manus	76	8	35	1	2	0	0	2	7	1	3	1	20	27		
7. Heidelberg	2.8%	13.5%	5.6%	16.4%	16.0%	6.9%	7.1%	6.3%	0.6%	0.8%	0.0%	8.3%	0.4%	1.0%		
7. Heldelberg	60	28	29	9	17	6	2	1	2	1	0	2	1	3		
8. Muenchen	2.7%	0.5%	0.4%	0.0%	12.3%	9.2%	0.0%	0.0%	4.2%	3.2%	2.9%	8.3%	3.5%	4.8%		
o. Muerichen	59	1	2	0	13	8	0	0	13	4	9	2	9	14		
9. Saintpaul	2.6%	0.0%	0.2%	0.0%	18.9%	3.4%	10.7%	0.0%	0.6%	0.0%	0.0%	8.3%	1.2%	3.5%		
J. Gairitpaul	56	0	1	0	20	3	3	0	2	0	0	2	3	10		
10. Montevideo	2.4%	0.5%	0.8%	0.0%	0.0%	0.0%	0.0%	25.0%	28.7%	16.9%	18.1%	0.0%	0.8%	1.4%		
10. Montevideo	53	1	4	0	0	0	0	4	89	21	56	0	2	4		

Figure 5. Top Non-Typhoidal *Salmonella* Serotypes from Humans in 2013 and their Relative Frequencies, 1996-2013

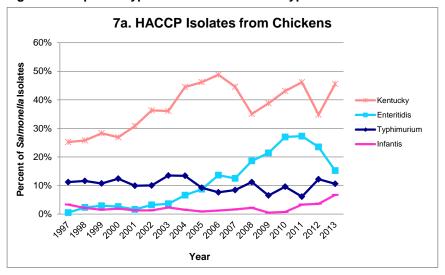


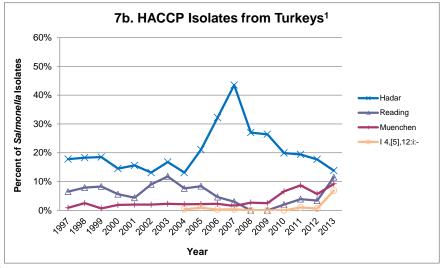
Figures 6. Top Non-Typhoidal Salmonella Serotypes from Retail Poultry in 2013 and their Relative Frequencies, 2002-2013



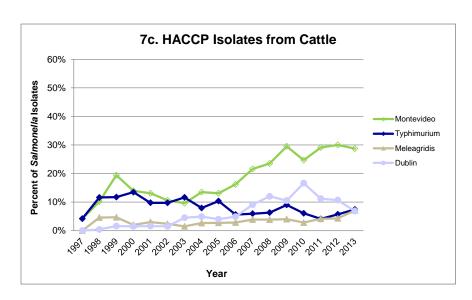


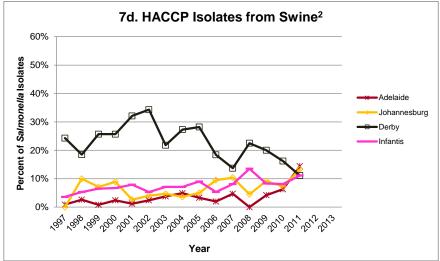
Figures 7. Top Non-Typhoidal Salmonella Serotypes from Food Animals in 2013 and their Relative Frequencies, 1997-2013





<sup>&</sup>lt;sup>1</sup> Antigenic formulas for Salmonella I 4,[5],12:i:- were not determined for food animal isolates prior to 2004





<sup>&</sup>lt;sup>2</sup> In 2012 and 2013, FSIS did not sample pork products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

## Antimicrobial Susceptibility among all Non-Typhoidal Salmonella

#### **MIC Distributions**

Table 12a. Distribution of MICs and Occurrence of Resistance among all Non-Typhoidal Salmonella Isolates, 2012

		Isolate Source										п	Distribution	1 (%) of M	Cs (ua/ml	) <sup>4</sup>						
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] 3	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Aminoglycosides	Gentamicin	Humans (2233)	<0.1	1.2	[0.8 - 1.7]					16.2	72.5	9.2	0.7	0.1	<0.1	0.3	0.9					
		κ Retail Chickens (229)	0.0	5.2	[2.7 - 9.0]					24.9	62.9	6.6	0.4			2.2	3.1					
		HACCP (864)	0.2	4.6	[3.3 - 6.3]					20.4	69.9	4.5	0.1	0.2	0.2	1.6	3.0					
		∞ Retail Ground Turkey (91)	1.1	26.4	[17.7 - 36.7]					9.9	44.0	18.7			1.1	6.6	19.8					
		HACCP (175)	1.1	24.6	[18.4 - 31.6]					8.6	58.3	6.9	0.6		1.1	5.7	18.9					
		<u>∞</u> Retail Ground Beef (13)	0.0	0.0	[0.0 - 24.7]					7.7	61.5	30.8										
		HACCP (280)	0.0	2.1	[0.8 - 4.6]					6.4	72.5	17.9	1.1			0.4	1.8					
		Petril Park Chans (42)	0.0	8.3	[0.2 - 38.5]						75.0	16.7					8.3					
	Kanamusia	Retail Pork Chops (12)	0.0		[0.7 - 1.6]						75.0	10.7			98.9		6.3	<0.1	1.0			
	Kanamycin	Humans (2233)		1.1														<0.1				
		Retail Chickens (229)	0.0	4.8	[2.4 - 8.4]										94.8	0.4			4.8			
		HACCP (864)	0.0	1.5	[0.8 - 2.6]										98.4	0.1		0.3	1.2			
		Retail Ground Turkey (91)	0.0	13.2	[7.0 - 21.9]										81.3	5.5			13.2			
		☐ HACCP (175)	2.3	12.0	[7.6 - 17.8]										84.6	1.1	2.3	2.3	9.7			
		Retail Ground Beef (13)	0.0	23.1	[5.0 - 53.8]										76.9				23.1			
		9 HACCP (280)	0.0	8.9	[5.9 - 12.9]										91.1				8.9			
		Retail Pork Chops (12)	0.0	0.0	[0.0 - 26.5]										100.0							
	Streptomycin	Humans (2233)	N/A	8.4	[7.3 - 9.6]												91.6	2.7	5.7			
		Retail Chickens (229)	N/A	30.6	[24.7 - 37.0]												69.4	12.2	18.3			
		HACCP (864)	N/A	32.1	[29.0 - 35.3]												67.9	23.5	8.6			
		∞ Retail Ground Turkey (91)	N/A	44.0	[33.6 - 54.8]												56.0	24.2	19.8			
		HACCP (175)	N/A	38.3	[31.1 - 45.9]												61.7	22.3	16.0			
		Retail Ground Beef (13)	N/A	23.1	[5.0 - 53.8]												76.9		23.1			
		HACCP (280)	N/A	18.9	[14.5 - 24.0]												81.1	2.9	16.1			
		ອ ເຂັ້ອ ເຂົ້ອ Retail Pork Chops (12)	N/A	41.7	[15.2 - 72.3]												58.3	16.7	25.0			
β-Lactam/β-Lactamase	Amoxicillin-Clavulanic Acid	Humans (2233)	2.6	2.9	[2.3 - 3.7]							89.3	1.7	0.9	2.6	2.6	0.1	2.8				
Inhibitor Combinations		Retail Chickens (229)	0.0	27.9	[22.2 - 34.2]							68.6	2.2	0.4	0.9		7.9	20.1				
		HACCP (864)	0.3	11.3	[9.3 - 13.6]							86.6	0.9		0.8	0.3	3.7	7.6				
		Retail Ground Turkey (91)	5.5	17.6	[10.4 - 27.0]							58.2	1.1	2.2	15.4	5.5	2.2	15.4				
		HACCP (175)	13.1	15.4	[10.4 - 21.6]							56.6	1.7	0.6	12.6	13.1	1.7	13.7				
			0.0	15.4	[1.9 - 45.4]							69.2	7.7	7.7				15.4				
		HACCP (280)	2.1	11.1	[7.6 - 15.3]							81.8	2.5	0.4	2.1	2.1	3.2	7.9				
		ac .	_																			
		້ Retail Pork Chops (12)	0.0	0.0	[0.0 - 26.5]							83.3		8.3	8.3							

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs greater than the lowest tested concentration.

Table 12b. Distribution of MICs and Occurrence of Resistance among all Non-Typhoidal Salmonella Isolates, 2012

Antimicrobial Class	Antimicrobial Agent	f Resistance among all No Isolate Source (# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	Distribution 2	n (%) of M 4	ICs (µg/ml 8	) <sup>4</sup> 16	32	64	128	256	512	1024
Cephems	Cefoxitin	Humans (2233)	0.3	2.7	[2.1 - 3.5]						0.1	17.7	62.5	15.0	1.7	0.3	0.9	1.8				
		Retail Chickens (229)	4.4	22.7	[17.4 - 28.7]							3.5	56.8	11.4	1.3	4.4	14.0	8.7				
		HACCP (864)	2.1	8.6	[6.8 - 10.6]							15.9	54.9	16.9	1.7	2.1	5.8	2.8				
		Retail Ground Turkey (91)	1.1	15.4	[8.7 - 24.5]							1.1	58.2	22.0	2.2	1.1	1.1	14.3				
		HACCP (175)	1.7	14.9	[9.9 - 21.0]						0.6	8.0	52.6	20.6	1.7	1.7	4.6	10.3				
		Retail Ground Beef (13)	0.0	15.4	[1.9 - 45.4]								30.8	38.5	15.4			15.4				
		О HACCP (280)	0.4	10.4	[7.0 - 14.5]							7.5	48.6	30.0	3.2	0.4	3.2	7.1				
		Retail Pork Chops (12)	0.0	0.0	[0.0 - 26.5]								75.0	25.0								
	Ceftiofur	Humans (2233)	0.1	2.9	[2.2 - 3.6]				0.3	0.6	23.6	70.8	1.7	0.1	0.1	2.7						
		Retail Chickens (229)	0.4	27.5	[21.8 - 33.8]						37.1	34.1	0.9	0.4	10.5	17.0						
		HACCP (864)	0.0	10.2	[8.2 - 12.4]																	
		Retail Ground Turkey (91)	1.1	16.5	[9.5 - 25.7]						29.7	49.5	3.3	1.1	1.1	15.4						
		À HACCP (175)	0.6	14.9	[9.9 - 21.0]						33.7	47.4	3.4	0.6		14.9						
		Retail Ground Beef (13)	0.0	15.4	[1.9 - 45.4]						15.4	61.5	7.7		15.4							
		Ö HACCP (280)	0.0	11.1	[7.6 - 15.3]					0.7	37.5	49.6	1.1		2.9	8.2						
		ຶ່ດ Retail Pork Chops (12)	0.0	0.0	[0.0 - 26.5]						41.7	58.3										
	Ceftriaxone	Humans (2233)	<0.1	2.9	[2.2 - 3.6]					97.0	<0.1		<0.1	<0.1	0.2	1.0	1.2	0.3	0.1			
		Retail Chickens (229)	0.0	27.9	[22.2 - 34.2]					71.6	0.4			1.3	9.6	13.1	3.5	0.4				
		HACCP (864)	0.2	11.2	[9.2 - 13.5]					88.1	0.5		0.2	1.5	2.5	5.7	0.9	0.6				
		⊗ Retail Ground Turkey (91)	0.0	17.6	[10.4 - 27.0]					82.4				1.1	1.1	4.4	8.8	2.2				
		Ē HACCP (175)	0.0	16.0	[10.9 - 22.3]					82.9	0.6	0.6		0.6	1.7	4.6	9.1					
		Retail Ground Beef (13)	0.0	15.4	[1.9 - 45.4]					84.6					15.4							
		9 HACCP (280)	0.4	10.7	[7.3 - 14.9]					88.2	0.4	0.4	0.4	0.7	1.1	4.6	3.9	0.4				
		Retail Pork Chops (12)	0.0	0.0	[0.0 - 26.5]					100.0												
Folate Pathway Inhibitors	Sulfisoxazole <sup>5</sup>	Humans (2233)	N/A	8.4	[7.3 - 9.6]											8.8	50.4	31.6	0.7	0.1	8.4	
		Retail Chickens (229)	N/A	37.1	[30.8 - 43.7]											30.6	22.3	10.0			37.1	
		HACCP (864)	N/A	14.4	[12.1 - 16.9]											17.0	54.6	13.5	0.2	0.2	14.4	
		Retail Ground Turkey (91)	N/A	27.5	[18.6 - 37.8]											31.9	26.4	14.3			27.5	
		À HACCP (175)	N/A	22.3	[16.4 - 29.2]											18.9	49.7	8.6	0.6		22.3	
		Retail Ground Beef (13)	N/A	23.1	[5.0 - 53.8]											30.8	23.1	23.1			23.1	
		О HACCP (280)	N/A	19.6	[15.2 - 24.8]											16.8	48.2	13.2	1.8	0.4	19.6	
		Retail Pork Chops (12)	N/A	33.3	[9.9 - 65.1]											25.0	33.3	8.3			33.3	

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

A Sex confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method
 The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

<sup>&</sup>lt;sup>5</sup> Sulfisoxazole replaced sulfamethoxazole in 2004

Table 12c. Distribution of MICs and Occurrence of Resistance among all Non-Typhoidal Salmonella Isolates, 2012

Trimethoprim- Sulfamethoxazole					0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16				256	512	1024
	Humans (2233)	N/A	1.3	[0.9 - 1.9]				97.2	1.4	<0.1		<0.1	0.2	1.1							
	Retail Chickens (229)	N/A	0.0	[0.0 - 1.6]				99.6	0.4												
	등 HACCP (864)	N/A	0.5	[0.1 - 1.2]				99.1	0.5					0.5							
	Retail Ground Turkey (91)	N/A	0.0	[0.0 - 4.0]				98.9	1.1												
	HACCP (175)	N/A	0.6	[0.0 - 3.1]				96.0	3.4					0.6							
	Retail Ground Beef (13)	N/A	0.0	[0.0 - 24.7]				84.6	15.4												
	HACCP (280)	N/A	1.1	[0.2 - 3.1]				87.9	10.0	1.1				1.1							
	Retail Pork Chops (12)	N/A	0.0	[0.0 - 26.5]				100.0													
Azithromycin	Humans (2233)	N/A	<0.1	[0.0 - 0.2]						0.1	0.2	9.3	83.3	6.8	0.3	<0.1					
	Retail Chickens (229)	N/A	0.0	[0.0 - 1.6]							2.2	18.3	79.5								
	당 HACCP (864)	N/A	0.0	[0.0 - 0.4]						0.3	0.6	31.7	64.6	2.8							
	Retail Ground Turkey (91)	N/A	0.0	[0.0 - 4.0]								9.9	81.3	8.8							
	HACCP (175)	N/A	0.0	[0.0 - 2.1]							0.6	32.6	60.6	5.7	0.6						
	Retail Ground Beef (13)	N/A	0.0	[0.0 - 24.7]								15.4	76.9	7.7							
	Ö HACCP (280)	N/A	0.0	[0.0 - 1.3]								19.6	74.6	5.7							
	Retail Pork Chops (12)	N/A	0.0	[0.0 - 26.5]								8.3	91.7								
Ampicillin	Humans (2233)	0.1	8.8	[7.6 - 10.0]							86.5	4.2	0.4	<0.1	0.1		8.8				
	Retail Chickens (229)	0.0	29.3	[23.5 - 35.6]							62.0	8.7					29.3				
	HACCP (864)	0.1	12.2	[10.0 - 14.5]							84.3	3.2		0.2	0.1	0.2	11.9				
	Retail Ground Turkey (91)	0.0	40.7	[30.5 - 51.5]							53.9	5.5					40.7				
	HACCP (175)	0.0	42.3	[34.9 - 50.0]							54.3	3.4				1.1	41.1				
	Retail Ground Beef (13)	0.0	23.1	[5.0 - 53.8]							69.2	7.7					23.1				
	HACCP (280)	0.0	15.4	[11.3 - 20.1]							82.1	1.8	0.7			0.4	15.0				
	Retail Pork Chops (12)	0.0	16.7	[2.1 - 48.4]							66.7	16.7					16.7				
Chloramphenicol	Humans (2233)	0.6	3.9	[3.1 - 4.8]								1.1	47.0	47.4	0.6	0.1	3.8				
	Retail Chickens (229)	0.0	0.0	[0.0 - 1.6]								4.4	53.7	41.9							
	이 HACCP (864)	0.1	0.6	[0.2 - 1.3]								9.6	69.4	20.3	0.1	0.1	0.5				
	Retail Ground Turkey (91)	1.1	3.3	[0.7 - 9.3]									47.3	48.4	1.1		3.3				
	HACCP (175)	2.9	1.1	[0.1 - 4.1]								4.6	66.3	25.1	2.9		1.1				
	⊕ Retail Ground Beef (13)	7.7	23.1	[5.0 - 53.8]									23.1	46.2	7.7		23.1				
	HACCP (280)	0.0	15.0	[11.0 - 19.7]								1.1	47.9	36.1			15.0				
	ອ ເຂັ້ອ ທີ່ Retail Pork Chops (12)	0.0	0.0	[0.0 - 26.5]								8.3	33.3	58.3							
	Ampicillin	HACCP (175)   Retail Ground Beef (13)   HACCP (280)     Retail Ground Beef (13)   HACCP (280)     Retail Pork Chops (12)   Humans (2233)   HACCP (864)   HACCP (864)   HACCP (864)   HACCP (280)   H	HACCP (175)   N/A	Acception   Part   Hacception   Hacception	HACCP (175)   N/A   0.6   (0.0 - 3.1)	Retail Ground Beef (13)	Page   Page	Page	Part   Harmon (223)   Harmon (223)	Part   Part	MacCP (175)	Part   Part	Martin	Fig.   Fig.	Resid Ground Bearl (13)	Accomplementable   File   Accomplementable   Accomplementary   A	MacCP (175)	MacCP (173)   MacCP (174)   MacCP (175)   MacCP (175)	Mail Clore   Period   Period	Main Print Charge (179)   Main Print Charg	Mail Ground Reard (13)   No.   0.0   0.0 - 2.71   No.   0.0   0.0   0.0   0.0   No.   0.0   0.0   0.0   No.   0.0

Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method <sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

Table 12d. Distribution of MICs and Occurrence of Resistance among all Non-Typhoidal Salmonella Isolates, 2012

		Isolate Source											Distribution	n (%) of MI	Cs (µg/ml	)4						
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Quinolones	Ciprofloxacin	Humans (2233)	3.3	0.3	[0.1 - 0.6]	89.7	6.5	0.3	1.0	1.3	0.9	0.2			0.1							
		Retail Chickens (229)	0.0	0.0	[0.0 - 1.6]	86.9	13.1															
		등 HACCP (864)	0.1	0.0	[0.0 - 0.4]	92.2	7.5	0.1		0.1												
		Retail Ground Turkey (91)	0.0	0.0	[0.0 - 4.0]	87.9	12.1															
		HACCP (175)	1.7	0.0	[0.0 - 2.1]	94.3	2.9	1.1			1.7											
		Retail Ground Beef (13)	0.0	0.0	[0.0 - 24.7]	61.5	38.5															
		Ö HACCP (280)	4.2	0.0	[0.0 - 1.3]	92.9	2.5	0.4		2.1	2.1											
		Retail Pork Chops (12)	0.0	0.0	[0.0 - 26.5]	83.3	16.7															
	Nalidixic Acid	Humans (2233)	N/A	2.4	[1.8 - 3.1]						0.1	0.6	40.3	54.5	1.3	0.9	0.2	2.2				
		Retail Chickens (229)	N/A	0.0	[0.0 - 1.6]								30.1	69.0	0.9							
		HACCP (864)	N/A	0.1	[0.0 - 0.6]						0.3	1.9	55.1	42.5	0.1			0.1				
		Retail Chickens (229)	N/A	0.0	[0.0 - 4.0]								40.7	58.2	1.1							
		HACCP (864)	N/A	1.7	[0.4 - 4.9]							0.6	53.1	43.4	1.1			1.7				
		Retail Ground Beef (13)  HACCP (280)	N/A	0.0	[0.0 - 24.7]								15.4	69.2	15.4							
		HACCP (280)	N/A	3.6	[1.7 - 6.5]							0.4	54.3	40.0	0.7	1.1		3.6				
		Retail Pork Chops (12)	N/A	0.0	[0.0 - 26.5]								33.3	66.7								
Tetracyclines	Tetracycline	Humans (2233)	0.2	11.1	[9.8 - 12.4]									88.8	0.2	0.5	2.2	8.3				
		Retail Chickens (229)	0.4	48.0	[41.4 - 54.7]									51.5	0.4		1.3	46.7				
		HACCP (864)	1.3	33.7	[30.5 - 36.9]									65.0	1.3	0.7	0.1	32.9				
		Retail Chickens (229)	0.0	45.1	[34.6 - 55.8]									55.0			2.2	42.9				
		F HACCP (864)	1.1	46.3	[38.7 - 54.0]									52.6	1.1		5.7	40.6				
		e Retail Ground Beef (13)  HACCP (280)	0.0	23.1 28.9	[5.0 - 53.8] [23.7 - 34.6]									76.9 70.4	0.7		2.5	23.1				
		<u>e</u>	0.7	20.9	[23.7 - 34.0]										0.7		2.0	20.4				
		Retail Pork Chops (12)	0.0	41.7	[15.2 - 72.3]									58.3				41.7				

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations. Numbers listed for the lowest tested concentrations is the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations.

Table 13a. Distribution of MICs and Occurrence of Resistance among all Non-Typhoidal Salmonella Isolates, 2013

Antimicrobial Class	Antimicrobial Agent	Isolate Source (# of Isolates)	%l <sup>1</sup>	%R²	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	Distri 1	ibution 2	(%) of M 4	IICs (µg/ 8	ml)⁴ 16	32	64	128	256	512	1024
Aminoglycosides	Gentamicin	Humans (2178)	<0.1	2.0	[1.4 - 2.7]					11.6	77.5	8.3	0.6	0.1	<0.1	0.6	1.4					
		Retail Chickens (208) HACCP (520) Cecal (55)	0.0 0.4 0.0	5.3 2.3 1.8	[2.7 - 9.3] [1.2 - 4.0] [0.0 - 9.7]					29.8 17.1 34.6	58.2 70.6 56.4	6.3 9.4 7.3	0.5	0.2	0.4	2.4 0.6 1.8	2.9 1.7					
		Retail Ground Turkey (106) HACCP (87) Cecal (28)	0.9 0.0 3.6	27.4 23.0 28.6	[19.1 - 36.9] [14.6 - 33.2] [13.2 - 48.7]					3.8 4.6 3.6	62.3 55.2 57.1	3.8 17.2 7.1	0.9	0.9	0.9	3.8 3.4	23.6 19.5 28.6					
		Retail (15)  HACCP (310)  Cecal (Beef) (124)  Cecal (Dairy) (310)	0.0 0.3 0.8 0.0	20.0 1.9 0.0 0.0	[4.3 - 48.1] [0.7 - 4.2] [0.0 - 2.9] [0.0 - 1.2]					13.3 4.5 7.3 3.6	46.7 72.6 76.6 66.5	20.0 19.7 14.5 27.1	1.0	0.8	0.3	6.7	13.3 1.9					
		Retail (24)  Cecal (Market Hogs) (260)  Cecal (Sows) (289)	0.0 1.2 0.7	0.0 1.2 0.7	[0.0 - 14.2] [0.2 - 3.3] [0.1 - 2.5]					8.9 13.5	95.8 73.5 72.0	4.2 14.2 12.5	0.8 0.4	0.4 0.4	1.2 0.7		1.2 0.7					
	Kanamycin	Humans (2178)	0.1	1.6	[1.1 - 2.2]										98.0	0.2	0.1	0.2	1.4			
		Retail Chickens (208) HACCP (520) Cecal (55)	0.0 0.0 0.0	11.1 1.2 3.6	[7.1 - 16.1] [0.4 - 2.5] [0.4 - 12.5]										98.8 96.4	0.5		0.2	11.1 1.0 3.6			
		Retail Ground Turkey (106) HACCP (87) Cecal (28)	1.9 0.0 3.6	10.4 6.9 10.7	[5.3 - 17.8] [2.6 - 14.4] [2.3 - 28.2]										86.8 93.1 85.7	0.9	1.9	0.9 3.6	9.4 6.9 7.1			
		Retail (15)  ## HACCP (310)  Cecal (Beef) (124)  Cecal (Dairy) (310)	6.7 0.0 0.0 0.0	13.3 6.1 2.4 0.6	[1.7 - 40.5] [3.7 - 9.4] [0.5 - 6.9] [0.1 - 2.3]										80.0 93.5 94.4 99.0	0.3 3.2 0.3	6.7	0.6	13.3 5.5 2.4 0.6			
		Retail (24) Cecal (Market Hogs) (260) Cecal (Sows) (289)	0.0 0.4 0.0	8.3 3.1 1.4	[1.0 - 27.0] [1.3 - 6.0] [0.4 - 3.5]										91.7 96.2 97.2	0.4 1.4	0.4		8.3 3.1 1.4			
	Streptomycin	Humans (2178)	N/A	11.5	[10.2 - 12.9]												88.5	3.0	8.5			
		Retail Chickens (208)  HACCP (520)  Cecal (55)	N/A N/A N/A	27.9 42.7 25.5	[21.9 - 34.5] [38.4 - 47.1] [14.7 - 39.0]												72.1 57.3 74.6	13.5 23.8 9.1	14.4 18.8 16.4			
		Retail Ground Turkey (106)  HACCP (87)  Cecal (28)	N/A N/A N/A	48.1 35.6 42.9	[38.3 - 58.0] [25.6 - 46.6] [24.5 - 62.8]												51.9 64.4 57.1	20.8 12.6 25.0	27.4 23.0 17.9			
		Retail (15)  HACCP (310)  Cecal (Beef) (124)  Cecal (Dairy) (310)	N/A N/A N/A	26.7 20.0 16.9 9.0	[7.8 - 55.1] [15.7 - 24.9] [10.8 - 24.7] [6.1 - 12.8]												73.3 80.0 83.1 91.0	1.6 0.8 0.3	26.7 18.4 16.1 8.7			
		Retail (24)  Retail (24)  Cecal (Market Hogs) (260)  Cecal (Sows) (289)	N/A N/A N/A	9.0 41.7 18.1 9.3	[22.1 - 63.4] [13.6 - 23.3] [6.2 - 13.3]												58.3 81.9 90.7	12.5 2.3 1.0	29.2 15.8 8.3			

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations.

Table 13b. Distribution of MICs and Occurrence of Resistance among all Non-Typhoidal Salmonella Isolates, 2013

Antimicrobial Class	Antimicrobial Agent	Isolate Source (# of Isolates)	%I <sup>1</sup>	%R²	[95% CI] <sup>3</sup>		0.03	0.06	0.125	0.25	0.50	Distr	bution (	[%) of M	IICs (µg/ 8	/ml) <sup>4</sup> 16	32	64	128	256	512 1	024
β-Lactam/β-Lactamase	Amoxicillin-Clavulanic Acid	Humans (2178)	2.6	2.4	[1.8 - 3.2]	0.010	0.00	0.00	0.120	0.20	0.00	84.2	3.9	1.7	5.2	2.6	0.1	2.3	120	200	0.2	
Inhibitor Combinations	Amoxiciiiii-Giavulanic Acid	· · · · · ·	-											1.7		2.0						
		Retail Chickens (208) HACCP (520)	0.0	19.7 8.8	[14.5 - 25.8] [6.5 - 11.6]							75.0 88.1	2.9 1.3	0.2	2.4 1.2	0.4	2.9	16.8 6.0				
		O Cecal (55)	0.0	7.3	[2.0 - 17.6]							85.5	1.8	0.2	5.5	0.4	1.8	5.5				
		σ Retail Ground Turkey (106)	6.6	8.5	[4.0 - 15.5]							51.9	0.9		32.1	6.6	0.9	7.6				
		HACCP (87)	2.3	9.2	[4.1 - 17.3]							72.4	1.1	1.1	13.8	2.3	0.0	9.2				
		Cecal (28)	3.6	7.1	[0.9 - 23.5]							60.7	3.6		25.0	3.6		7.1				
		Retail (15)	0.0	26.7	[7.8 - 55.1]							73.3						26.7				
		⊕ HACCP (310)	0.3	14.8	[11.1 - 19.3]							80.6	2.3		1.9	0.3	2.9	11.9				
		Ö Cecal (Beef) (124)	8.0	10.5	[5.7 - 17.3]							82.3	3.2		3.2	0.8	2.4	8.1				
		Cecal (Dairy) (310)	0.3	6.8	[4.2 - 10.2]							88.4	3.6		1.0	0.3	0.7	6.1				
		Retail (24)	8.3	0.0	[0.0 - 14.2]							75.0			16.7	8.3						
		Cecal (Market Hogs) (260)	4.6 0.3	1.9 2.4	[0.6 - 4.4]							88.5 94.1	1.9 2.4	8.0	2.3 0.7	4.6 0.3	0.8	1.2 2.1				
		Cecal (Sows) (289)			[1.0 - 4.9]												1					
Cephems	Cefoxitin	Humans (2178)	0.4	2.4	[1.8 - 3.2]						0.1	5.9	72.0	17.9	1.3	0.4	0.7	1.7				
		တ္ Retail Chickens (208)	2.4	17.3	[12.4 - 23.1]							7.2	55.3	16.8	1.0	2.4	12.5	4.8				
		Š HACCP (520)	1.5	7.1	[5.1 - 9.7]							14.4	57.5	18.1	1.3	1.5	5.0	2.1				
		Cecal (55)	3.6	3.6	[0.4 - 12.5]							5.5	67.3	18.2	1.8	3.6		3.6				
		φ Retail Ground Turkey (106)  HACCP (87)	0.9	8.5	[4.0 - 15.5]							4.7	50.9	34.9		0.9	1.9	6.6				
		본 HACCP (87) Cecal (28)	0.0	9.2 7.1	[4.1 - 17.3] [0.9 - 23.5]							5.7 3.6	50.6 46.4	32.2 39.3	2.3 3.6		2.3	6.9 7.1				
												0.0			0.0	6.7	6.7					
		Retail (15)  # HACCP (310)	6.7 0.6	20.0 14.5	[4.3 - 48.1] [10.8 - 18.9]							6.1	26.7 44.8	46.7 32.6	1.3	6.7 0.6	6.7 6.5	13.3 8.1				
		Cecal (Beef) (124)	0.8	10.5	[5.7 - 17.3]							1.6	40.3	44.4	2.4	0.8	6.5	4.0				
		Cecal (Dairy) (310)	0.3	6.8	[4.2 - 10.2]							3.9	54.8	32.3	1.9	0.3	3.6	3.2				
		Retail (24)	0.0	0.0	[0.0 - 14.2]								54.2	33.3	12.5							
		Cecal (Market Hogs) (260)	0.0	1.9	[0.6 - 4.4]							2.3	35.4	56.5	3.9		8.0	1.2				
		Cecal (Sows) (289)	0.4	2.4	[1.0 - 4.9]							2.1	38.4	54.7	2.1	0.4	0.7	1.7				
	Ceftiofur	Humans (2178)	0.1	2.5	[1.9 - 3.3]				0.1	0.2	13.3	81.7	2.1	0.1	0.1	2.4						
		g Retail Chickens (208)	0.0	19.7	[14.5 - 25.8]						28.4	51.4	0.5		9.1	10.6						
		ਰ <u>ਤ</u> ੁੱ HACCP (520)	0.8	8.1	[5.9 - 10.8]						44.4	46.0	0.8	0.8	1.5	6.5						
		ਹ Cecal (55)	0.0	7.3	[2.0 - 17.6]				1.8		36.4	54.6			3.6	3.6						
		κ Retail Ground Turkey (106)	0.0	9.4	[4.6 - 16.7]						16.0	72.6	1.9		0.9	8.5						
		HACCP (87)	0.0	10.3	[4.8 - 18.7]						20.7	66.7	2.3			10.3						
		Cecal (28)	0.0	7.1	[0.9 - 23.5]						3.6	89.3				7.1						
		Retail (15)	6.7	20.0	[4.3 - 48.1]						6.7	66.7		6.7	6.7	13.3						
		## HACCP (310) Cecal (Beef) (124)	0.3	14.8 10.5	[11.1 - 19.3]					1.0	18.1 12.1	64.5 74.2	1.3 2.4	0.3	1.0	13.9 10.5						
		Cecal (Beer) (124) Cecal (Dairy) (310)	0.0	6.8	[5.7 - 17.3] [4.2 - 10.2]					0.8	23.2	68.4	1.3			6.8						
		Retail (24)	0.0	0.0	[0.0 - 14.2]						16.7	75.0	8.3									
		© Cecal (Market Hogs) (260)	0.0	2.3	[0.9 - 5.0]						13.9	80.8	3.1			2.3						
		တ် Cecal (Sows) (289)	0.0	2.4	[1.0 - 4.9]						18.7	77.5	1.4			2.4						

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

Table 13c. Distribution of MICs and Occurrence of Resistance among all Non-Typhoidal Salmonella Isolates, 2013

		Isolate Source			annonena is	l '						Distri	bution	(%) of M	ICs (ua/ı	ml) <sup>4</sup>						
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R²	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Cephems	Ceftriaxone	Humans (2178)	0.1	2.5	[1.9 - 3.3]					97.2	0.1	<0.1	0.1		0.2	1.1	1.0	0.2				
		g Retail Chickens (208)	0.0	19.7	[14.5 - 25.8]					79.8	0.5			0.5	11.5	6.3	1.4					
		HACCP (520)	0.2	8.7	[6.4 - 11.4]					91.2			0.2	0.8	2.5	4.4	1.0					
		ਹੈ Cecal (55)	0.0	7.3	[2.0 - 17.6]					92.7				1.8	1.8		3.6					
		ρ Retail Ground Turkey (106)	0.0	9.4	[4.6 - 16.7]					90.6						4.7	1.9	1.9	0.9			
		HACCP (87)	0.0	10.3	[4.8 - 18.7]					89.7					1.1	3.4	3.4		2.3			
		은 Cecal (28)	0.0	7.1	[0.9 - 23.5]					92.9							3.6	3.6				
		Retail (15)	0.0	26.7	[7.8 - 55.1]					73.3				6.7		13.3	6.7					
		⊕ HACCP (310)	0.0	14.8	[11.1 - 19.3]					85.2					3.5	7.1	3.9	0.3				
		Ö Cecal (Beef) (124)	0.0	10.5	[5.7 - 17.3]					89.5						7.3	2.4	8.0				
		Cecal (Dairy) (310)	0.0	6.8	[4.2 - 10.2]					93.2					0.3	4.2	1.3	1.0				
		Retail (24)	0.0	0.0	[0.0 - 14.2]					100.0												
		Cecal (Market Hogs) (260)	0.0	2.3	[0.9 - 5.0]					97.7						1.2	8.0	0.4				
		Cecal (Sows) (289)	0.0	2.4	[1.0 - 4.9]					97.2	0.4					1.0	1.4					
Folate Pathway Inhibitors	Sulfisoxazole <sup>5</sup>	Humans (2178)	N/A	10.3	[9.1 - 11.7]											10.8	56.2	21.7	0.6	0.4	10.3	
		∞ Retail Chickens (208)	N/A	33.7	[27.3 - 40.5]											23.1	36.1	7.2			33.7	
		. HACCP (520)	N/A	11.0	[8.4 - 14.0]											12.3	61.5	15.0	0.2		11.0	
		ਹ Cecal (55)	N/A	30.9	[19.1 - 44.8]											30.9	41.8	10.9			30.9	
		Retail Ground Turkey (106)	N/A	27.4	[19.1 - 36.9]											18.9	33.0	20.8			27.4	
		NACCP (87)	N/A	29.9	[20.5 - 40.6]											24.1	33.3	12.6			29.9	
		Cecal (28)	N/A	14.3	[4.0 - 32.7]											25.0	28.6	32.1			14.3	
		Retail (15)	N/A	40.0	[16.3 - 67.7]											46.7	13.3				40.0	
		⊕ HACCP (310)	N/A	20.6	[16.3 - 25.6]											14.5	49.7	13.5	1.6		20.6	
		Ö Cecal (Beef) (124)	N/A	18.5	[12.1 - 26.5]											22.6	41.1	17.7			18.5	
		Cecal (Dairy) (310)	N/A	9.0	[6.1 - 12.8]											32.3	45.5	13.2			9.0	
		Retail (24)	N/A	29.2	[12.6 - 51.1]											20.8	37.5	12.5			29.2	
		Cecal (Market Hogs) (260) Cecal (Sows) (289)	N/A N/A	20.8 9.7	[16.0 - 26.2]											32.3 37.4	34.6 36.3	12.3 16.3	0.4		20.8 9.7	
	Trimethoprim-				[6.5 - 13.7]									I		37.4	30.3	10.3	0.4		9.1	
	Sulfamethoxazole	Humans (2178)	N/A	1.4	[1.0 - 2.0]				95.7	2.4	0.3	<0.1	0.1	0.2	1.2							
		e Retail Chickens (208)	N/A	0.0	[0.0 - 1.8]				99.5	0.5												
		ਤੁੱ HACCP (520) O Cecal (55)	N/A N/A	0.2 3.6	[0.0 - 1.1]				99.2 94.6	0.6 1.8					0.2 3.6							
		- 2004. (00)			[0.4 - 12.5]					1.0					3.0							
		Retail Ground Turkey (106)	N/A	0.9	[0.0 - 5.1]				99.1					0.9								
		복 HACCP (87) - Cecal (28)	N/A N/A	1.1 0.0	[0.0 - 6.2] [0.0 - 12.3]				96.6 100.0	2.3					1.1							
										46.5												
		Retail (15)  # HACCP (310)	N/A N/A	0.0 1.3	[0.0 - 21.8]				86.7 88.7	13.3 8.4	1.3	0.3			1.3							
		# HACCP (310)  Cocal (Beef) (124)	N/A N/A	2.4	[0.4 - 3.3] [0.5 - 6.9]				95.2	2.4	1.3	v.s			2.4							
		Cecal (Deiry) (310)	N/A	0.6	[0.1 - 2.3]				97.7	1.6					0.6							
		Retail (24)	N/A	0.0	[0.0 - 14.2]				95.8	4.2												
		Cecal (Market Hogs) (260)	N/A	0.8	[0.1 - 2.8]				95.8	3.5					0.8							
		ົດ Cecal (Sows) (289)	N/A	1.0	[0.2 - 3.0]				98.3	0.7					1.0							

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

<sup>&</sup>lt;sup>5</sup> Sulfisoxazole replaced sulfamethoxazole in 2004

Table 13d. Distribution of MICs and Occurrence of Resistance among all Non-Typhoidal Salmonella Isolates, 2013

		Isolate Source												(%) of M	ICs (µg/							
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Macrolides	Azithromycin	Humans (2178)	N/A	0.2	[0.1 - 0.5]					<0.1	<0.1	0.1	2.8	82.8	13.3	0.6	0.2					
		g Retail Chickens (208)	N/A	0.0	[0.0 - 1.8]							1.0	15.9	78.4	4.8							
		호 HACCP (520)	N/A	0.0	[0.0 - 0.7]							8.0	16.9	76.0	6.3							
		ပ် Cecal (55)	N/A	0.0	[0.0 - 6.5]							1.8	18.2	80.0								
		Retail Ground Turkey (106)	N/A	0.0	[0.0 - 3.4]							1.9	27.4	66.0	4.7							
		र्थे HACCP (87)	N/A	0.0	[0.0 - 4.2]								21.8	73.6	4.6							
		⊢ Cecal (28)	N/A	0.0	[0.0 - 12.3]								7.1	89.3	3.6							
		Retail (15)	N/A	0.0	[0.0 - 21.8]									100.0								
		⊕ HACCP (310)	N/A	0.0	[0.0 - 1.2]								10.3	80.3	9.0	0.3						
		රී Cecal (Beef) (124)	N/A	0.0	[0.0 - 2.9]								5.7	90.3	4.0							
		Cecal (Dairy) (310)	N/A	0.0	[0.0 - 1.2]								6.1	91.6	2.3							
		Retail (24)	N/A	0.0	[0.0 - 14.2]								4.2	66.7	29.2							
		Cecal (Market Hogs) (260)	N/A	0.4	[0.0 - 2.1]								5.0	81.5	12.7	0.4	0.4					
		Cecal (Sows) (289)	N/A	0.3	[0.0 - 1.9]								9.0	76.1	14.5		0.3					
Penicillins	Ampicillin	Humans (2178)	0.0	10.4	[9.2 - 11.8]							81.1	7.2	0.9	0.4		0.1	10.3				
		g Retail Chickens (208)	0.0	22.1	[16.7 - 28.4]							67.3	10.1	0.5				22.1				
		<u>항</u> HACCP (520)	0.0	10.4	[7.9 - 13.3]							83.8	5.8					10.4				
		ਹ Cecal (55)	0.0	12.7	[5.3 - 24.5]							83.6	3.6					12.7				
		Retail Ground Turkey (106)	0.0	47.2	[37.4 - 57.1]							48.1	4.7					47.2				
		HACCP (87)	0.0	26.4	[17.6 - 37.0]							71.3	2.3					26.4				
		Cecal (28)	0.0	35.7	[18.6 - 55.9]							53.6	10.7					35.7				
		Retail (15)	0.0	26.7	[7.8 - 55.1]							73.3						26.7				
		⊕ HACCP (310)	0.0	17.1	[13.1 - 21.8]							78.1	4.5	0.3				17.1				
		Ö Cecal (Beef) (124)	0.0	14.5	[8.8 - 22.0]							81.5	4.0					14.5				
		Cecal (Dairy) (310)	0.0	8.1	[5.3 - 11.7]							88.4	3.6					8.1				
		Retail (24)	0.0	25.0	[9.8 - 46.7]							70.8	4.2					25.0				
		Cecal (Market Hogs) (260)	0.0	9.6	[6.3 - 13.9]							85.8	3.9	8.0				9.6				
		Cecal (Sows) (289)	0.0	3.5	[1.7 - 6.3]							91.4	5.2				1	3.5				
Phenicols	Chloramphenicol	Humans (2178)	0.9	3.9	[3.1 - 4.8]								0.5	37.3	57.3	0.9	<0.1	3.9				
		g Retail Chickens (208)	0.0	0.5	[0.0 - 2.6]									50.0	49.5			0.5				
		) HACCP (520)	0.2	0.4	[0.0 - 1.4]								6.0	60.4	33.1	0.2	0.2	0.2				
		Ö Cecal (55)	1.8	0.0	[0.0 - 6.5]								1.8	56.4	40.0	1.8						
		Retail Ground Turkey (106)	0.0	2.8	[0.6 - 8.0]								2.8	41.5	52.8			2.8				
		원 HACCP (87)	3.4	1.1	[0.0 - 6.2]									52.9	42.5	3.4		1.1				
		Cecal (28)	0.0	0.0	[0.0 - 12.3]									32.1	67.9							
		Retail (15)	0.0	26.7	[7.8 - 55.1]									13.3	60.0			26.7				
		# HACCP (310)	0.6	15.5	[11.6 - 20.0]								0.3	34.2	49.4	0.6	0.3	15.2				
		Ö Cecal (Beef) (124)	0.0	12.9	[7.6 - 20.1]								1.0	24.2	62.9		12.9	7.4				
		Cecal (Dairy) (310)	0.0	7.4	[4.8 - 10.9]								1.9	46.8	43.9			7.4				
		Retail (24)	4.2	12.5	[2.7 - 32.4]									8.3	75.0	4.2		12.5				
		Cecal (Market Hogs) (260)	2.3 0.3	3.5	[1.6 - 6.5]								0.7	14.6	79.6	2.3 0.3	0.3	3.5 2.1				
	L	Cecal (Sows) (289)	0.3	2.4	[1.0 - 4.9]								0.7	18.7	77.9	0.3	0.3	2.1				

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

 $<sup>^3</sup>$  95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

Table 13e. Distribution of MICs and Occurrence of Resistance among all Non-Typhoidal Salmonella Isolates, 2013

		Isolate Source										Distri	bution	(%) of M	ICs (µg/	ml) <sup>4</sup>						
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Quinolones	Ciprofloxacin	Humans (2178)	3.0	0.5	[0.3 - 0.9]	83.0	13.1	0.4	1.0	1.1	0.9	0.1	0.1		0.3							
		g Retail Chickens (208)	0.0	0.0	[0.0 - 1.8]	80.8	19.2															
		ទី HACCP (520)	0.0	0.0	[0.0 - 0.7]	88.8	11.2															
		Ö Cecal (55)	0.0	0.0	[0.0 - 6.5]	78.2	21.8															
		Retail Ground Turkey (106)	0.0	0.0	[0.0 - 3.4]	85.9	12.3	1.9														
		HACCP (87) Cecal (28)	0.0	0.0 0.0	[0.0 - 4.2] [0.0 - 12.3]	94.3 78.6	4.6 21.4				1.1											
		Retail (15)	0.0	0.0	[0.0 - 21.8]	73.3	26.7															
		⊕ HACCP (310)	3.9	0.0	[0.0 - 21.8]	90.3	5.2	0.6	0.3	1.0	2.6											
		Cecal (Beef) (124)	0.0	0.0	[0.0 - 2.9]	73.4	2.4	24.2														
		Cecal (Dairy) (310)	0.0	0.3	[0.0 - 1.8]	80.3	19.4					0.3										
		Retail (24)	0.0	0.0	[0.0 - 14.2]	62.5	33.3	4.2														
		Cecal (Market Hogs) (260)	2.3	0.4	[0.0 - 2.1]	63.9	32.7	0.8		0.8	1.5				0.4							
		Cecal (Sows) (289)	2.1	0.3	[0.0 - 1.9]	60.9	36.3	0.3		0.3	1.7			0.3			11					
	Nalidixic Acid	Humans (2178)	N/A	2.8	[2.1 - 3.6]						<0.1	0.1	30.3	64.6	1.2	0.9	0.5	2.3				
		g Retail Chickens (208)	N/A	0.0	[0.0 - 1.8]								26.4	73.1	0.5							
		ਤੁੱ HACCP (520) 5 Cecal (55)	N/A N/A	0.0 0.0	[0.0 - 0.7]						1.8	2.1	59.4 29.1	38.3 67.3	0.2 1.8							
		2000(00)			[0.0 - 6.5]						1.0	0.0										
		Retail Chickens (208)  HACCP (520)	N/A N/A	0.0 1.1	[0.0 - 3.4] [0.0 - 6.2]							0.9	23.6 62.1	74.5 36.8	0.9			1.1				
		Cecal (55)	N/A	0.0	[0.0 - 12.3]								10.7	89.3								
		Retail (15)	N/A	0.0	[0.0 - 21.8]								20.0	80.0								
		⊕ HACCP (310)	N/A	2.3	[0.9 - 4.6]							0.3	49.0	45.8	1.0	1.6	0.3	1.9				
		Ö Cecal (Beef) (124)	N/A	1.6	[0.2 - 5.7]								19.4	77.4	8.0	8.0	1.6					
		Cecal (Dairy) (310)	N/A	0.3	[0.0 - 1.8]							0.3	31.6	67.7				0.3				
		Retail (24)  ———————————————————————————————————	N/A N/A	0.0 1.2	[0.0 - 14.2] [0.2 - 3.3]								16.7 19.6	75.0 75.0	8.3 2.7	1.5	0.4	0.8				
		Cecal (Sows) (289)	N/A	0.7	[0.1 - 2.5]								15.9	81.0	0.7	1.7	0.3	0.3				
Tetracyclines	Tetracycline	Humans (2178)	1.0	12.6	[11.3 - 14.1]									86.4	1.0	0.2	2.1	10.4				
	,	g Retail Chickens (208)	0.0	49.0	[42.1 - 56.0]									51.0		0.5		48.6				
		HACCP (520)	0.4	42.7	[38.4 - 47.1]									56.9	0.4	0.2	0.4	42.1				
		ੁੱ Cecal (55)	1.8	38.2	[25.4 - 52.3]									60.0	1.8			38.2				
		ρ Retail Chickens (208)	0.0	62.3	[52.3 - 71.5]									37.7			0.9	61.3				
		HACCP (520)	0.0	43.7	[33.1 - 54.7]									56.3			8.0	35.6				
		Cecal (55)	0.0	46.4	[27.5 - 66.1]									53.6				46.4				
		Retail (15)	0.0	46.7	[21.3 - 73.4]									53.3				46.7				
		# HACCP (310) C Cecal (Beef) (124)	0.0	24.8 28.2	[20.1 - 30.0] [20.5 - 37.0]									75.2 71.0		0.3	1.6 4.0	22.9				
		Cecal (Dairy) (310)	0.0	11.0	[7.7 - 15.0]									87.7		1.3	1.9	9.0				
		Retail (24)	0.0	45.8	[25.6 - 67.2]									54.2			8.3	37.5				
		Cecal (Market Hogs) (260)	0.0	31.2	[25.6 - 37.2]									68.9			6.2	25.0				
		Cecal (Sows) (289)	0.0	24.2	[19.4 - 29.6]									75.4		0.3	5.5	18.7				

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

Year		.cg	all Non-Typhoidal S	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ted	/0	Humans	1998	1855	1782	2036	2171	2145	2384	2193	2449	2335	2233	2178
		Chickens	Retail Chickens HACCP Cecal	60 1500	83 1158	157 1280	153 1989	152 1380	99 994	198 624	272 551	171 564	158 491	229 864	208 520 55
		Turkeys	Retail Ground Turkey HACCP Cecal	74 244	114 262	142 236	183 227	159 304	190 271	246 148	193 121	202 151	162 103	91 175	106 87 28
		Cattle	Retail Ground Beef HACCP	9 1008	10 670	14 607	8 329	19 389	13 439	24 443	14 200	7 247	9 340	13 280	15 310
		0	Cecal (Beef) Cecal (Dairy) Retail Pork Chops	10	5	11	9	8	18	23	8	20	28	12	124 310 24
	I Antimiorakia	Swine	HACCP <sup>1</sup> Cecal (Market Hogs) Cecal (Sows)	379	211	308	301	304	211	111	120	111	90		260 289
Antimicrobial Class	Antimicrobial (Resistance Breakpoint)		Isolate Source												
Aminoglycosides	Gentamicin (MIC ≥ 16 µg/mI)		Humans	1.4% 27	1.4% 26	1.3% 24	2.2% 44	2.0% 44	2.1% 45	1.5% 35	1.3% 28	1.0% 24	1.7% 40	1.2% 26	2.0% 43
	(WIIO 2 TO pg/III)	s	Retail Chickens	10.0%	6.0%	3.8%	3.3%	9.2%	6.1%	7.1% 14	3.3%	5.8% 10	3.8%	5.2% 12	5.3% 11
		Chickens	HACCP	5.5% 83	6.3% 73	4.9% 63	4.3% 85	5.7% 79	4.5% 45	5.6%	5.6% 31	4.6% 26	3.5% 17	4.6% 40	2.3% 12
		ర్	Cecal	- 55	,,,	- 50		,,,		00	Ų.		.,		1.8%
			Retail Ground Turkey	14.9% 11	22.8% 26	20.4% 29	26.8% 49	28.9% 46	24.7% 47	27.6% 68	18.7% 36	16.3% 33	32.1% 52	26.4% 24	27.4% 29
		Turkeys	HACCP	19.3% 47	21.0% 55	25.4% 60	22.9% 52	16.4% 50	12.9% 35	16.9% 25	14.9% 18	19.9% 30	14.6% 15	24.6% 43	23.0%
		ĭ	Cecal	.,	- 55	- 00	- OL	- 00	00	20	10		.0	.0	28.6%
			Retail Ground Beef	0.0%	0.0%	0.0%	25.0% 2	0.0%	7.7% 1	8.3% 2	14.3% 2	0.0%	0.0%	0.0%	20.0%
		tle te	HACCP	2.6% 26	2.7% 18	1.8%	2.4%	3.9% 15	1.6% 7	1.6%	2.0%	4.9% 12	2.1%	2.1%	1.9%
		Cattle	Cecal (Beef)				-					.=		-	0.0%
			Cecal (Dairy)												0.0%
			Retail Pork Chops	30.0% 3	0.0%	0.0%	0.0% 0	50.0% 4	5.6% 1	13.0% 3	0.0%	10.0% 2	3.6% 1	8.3% 1	0.0% 0
		ne	HACCP	0.8%	0.5%	1.3%	2.7%	2.0%	0.9%	2.7%	0.0%	2.7%	0.0%		
		Swine	Cecal (Market Hogs)												3.1% 8
			Cecal (Sows)												0.7% 2
	Kanamycin (MIC ≥ 64 μg/mI)		Humans	3.8% 76	3.5% 64	2.8% 50	3.4% 70	2.9% 63	2.8% 61	2.1% 50	2.5% 54	2.2% 54	1.7% 39	1.1% 24	1.6% 35
	( = 1 · pg)	s	Retail Chickens	6.7% 4	4.8%	11.5% 18	4.6% 7	9.9% 15	5.1% 5	10.6% 21	15.4% 42	8.2% 14	11.4% 18	4.8% 11	11.1% 23
		Chickens	HACCP	2.0%	2.8%	2.7% 34	2.5% 49	3.6% 49	3.4% 34	3.4% 21	3.1% 17	4.3% 24	0.6%	1.5% 13	1.2%
		ò	Cecal												3.6%
			Retail Ground Turkey	18.9% 14	27.2% 31	18.3% 26	20.2% 37	15.1% 24	23.7% 45	17.9% 44	6.7% 13	15.8% 32	14.8% 24	13.2% 12	10.4% 11
		urkeys	HACCP	24.2% 59	16.0% 42	14.4% 34	19.8% 45	10.5% 32	16.2% 44	14.2% 21	10.7% 13	19.2% 29	8.7% 9	12.0% 21	6.9% 6
		F	Cecal												10.7% 3
			Retail Ground Beef	0.0%	0.0%	0.0%	25.0% 2	5.3% 1	0.0%	8.3% 2	14.3% 2	14.3% 1	11.1% 1	23.1% 3	13.3% 2
		attle	HACCP	10.1% 102	13.7% 92	8.9% 54	13.1% 43	9.5% 37	7.7% 34	9.9% 44	9.0% 18	12.6% 31	6.2% 21	8.9% 25	6.1% 19
		Cat	Cecal (Beef)												2.4% 3
			Cecal (Dairy)												0.6% 2
			Retail Pork Chops	10.0% 1	0.0%	9.1% 1	0.0% 0	25.0% 2	5.6% 1	0.0%	12.5% 1	10.0% 2	7.1% 2	0.0%	8.3% 2
		ne	HACCP	4.2% 16	5.7% 12	3.9% 12	5.0% 15	8.6% 26	7.1% 15	3.6% 4	4.2% 5	10.8% 12	3.3%		
		Swine	Cecal (Market Hogs)												3.1% 3
			Cecal (Sows)												1.4% 4
	Streptomycin (MIC ≥ 64 µg/ml)		Humans	13.2% 264	15.0% 279	12.0% 213	11.1% 225	10.7% 233	10.3% 222	10.0% 238	8.9% 196	8.6% 210	9.8% 229	8.4% 187	11.5% 251
		SI	Retail Chickens	28.3% 17	26.5% 22	28.0% 44	30.1% 46	36.2% 55	30.3% 30	23.7% 47	23.2% 63	25.1% 43	38.6% 61	30.6% 70	27.9% 58
		Chickens	HACCP	22.9% 343	19.6% 227	22.2% 284	23.3% 464	21.2% 293	19.3% 192	25.2% 157	30.5% 168	36.0% 203	35.8% 176	32.1% 277	42.7% 222
		٥	Cecal												25.5% 14
		s	Retail Ground Turkey	37.8% 28	45.6% 52	34.5% 49	44.3% 81	40.9% 65	45.8% 87	58.5% 144	28.0% 54	31.7% 64	56.2% 91	44.0% 40	48.1% 51
		Turkeys	HACCP	37.7% 92	29.4% 77	33.9% 80	40.1% 91	28.9% 88	34.7% 94	32.4% 48	38.8% 47	27.8% 42	22.3%	38.3% 67	35.6% 31
		ľ	Cecal												42.9% 12
			Retail Ground Beef	22.2% 2	40.0% 4	14.3% 2	25.0% 2	10.5% 2	0.0%	20.8% 5	28.6% 4	42.9% 3	33.3% 3	23.1% 3	26.7% 4
		a He	HACCP	25.9% 261	28.7% 192	20.9% 127	24.3% 80	23.7% 92	19.8% 87	23.0% 102	22.0% 44	26.7% 66	19.4% 66	18.9% 53	20.0% 62
		Cattle	Cecal (Beef)												16.9% 21
			Cecal (Dairy)												9.0% 28
			Retail Pork Chops	70.0% 7	40.0% 2	27.3% 3	33.3%	25.0% 2	16.7% 3	13.0%	37.5% 3	45.0% 9	57.1% 16	41.7% 5	41.7% 10
			HACCP	40.1%	30.8%	36.4% 112	36.5% 110	26.3%	27.0%	29.7%	29.2%	31.5%	18.9%	_	1
		2	1 11 10 0 1	152					57		.30	.55	17		
		Swine	Cecal (Market Hogs)	152	65	112	110	80	57	33	35	35	17		18.1% 47

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 14b	Antimiarabial	Dagistanas aman	g all Non-Typhoida	I Calmanalla laala	*** 2002 2012

Year Number of Isolates Test	ed	1		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
			Humans	1998	1855	1782	2036	2171	2145	2384	2193	2449	2335	2233	2178
		sus	Retail Chickens	60	83	157	153	152	99	198	272	171	158	229	208
		Chickens	HACCP	1500	1158	1280	1989	1380	994	624	551	564	491	864	520
		_	Cecal												55
		Turkeys	Retail Ground Turkey HACCP	74 244	114 262	142 236	183 227	159 304	190 271	246 148	193 121	202 151	162 103	91 175	106 87
		Ţ	Cecal	244	202	230	221	304	2/1	140	121	131	103	173	28
			Retail Ground Beef	9	10	14	8	19	13	24	14	7	9	13	15
		Cattle	HACCP	1008	670	607	329	389	439	443	200	247	340	280	310
			Cecal (Beef) Cecal (Dairy)												124 310
			Retail Pork Chops	10	5	11	9	8	18	23	8	20	28	12	24
		Swine	HACCP <sup>1</sup>	379	211	308	301	304	211	111	120	111	90		
		Ó	Cecal (Market Hogs) Cecal (Sows)												260 289
	Antimicrobial														203
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin- Clavulanic Acid		Humans	5.3% 105	4.6% 86	3.7% 66	3.2% 65	3.7% 81	3.3% 70	3.1% 73	3.4% 75	2.9% 70	2.6% 60	2.9% 65	2.4% 53
illibitor Combinations	(MIC ≥ 32 / 16 μg/ml)	T.	Retail Chickens	10.0%	25.3%	24.8%	21.6%	19.1%	16.2%	22.2%	37.5%	33.3%	33.5%	27.9%	19.7%
		Chickens	HACCP	6 10.2%	9.7%	39 12.4%	33 12.1%	29 12.9%	16 15.6%	8.7%	102 12.9%	57 11.7%	53 6.3%	64 11.3%	8.8%
		Chic		153	112	159	241	178	155	54	71	66	31	98	46 7.3%
		-	Cecal	12.2%	11.4%	7.7%	8.7%	5.0%	5.3%	5.7%	5.7%	16.3%	21.0%	17.6%	4 8.5%
		ys	Retail Ground Turkey	9	13	11	16	8	10	14	11	33	34	16	9
		Turkeys	HACCP	3.7% 9	1.5% 4	4.7% 11	3.5% 8	5.6% 17	11.1% 30	5.4% 8	13.2% 16	15.2% 23	11.7% 12	15.4% 27	9.2% 8
		-	Cecal												7.1% 2
			Retail Ground Beef	22.2%	40.0%	14.3%	0.0%	0.0%	0.0%	8.3%	14.3%	28.6%	11.1%	15.4%	26.7%
		m	HACCP	17.7%	21.0%	13.5%	21.0%	18.5%	15.5%	16.5%	15.0%	21.5%	14.7%	11.1%	14.8%
		Cattle	Cecal (Beef)	178	141	82	69	72	68	73	30	53	50	31	46 10.5%
		ľ													13 6.8%
		_	Cecal (Dairy)	00.00/	00.00/	0.00/	0.00/	0.00/	0.00/	0.00/	05.00/	0.00/	0.00/	0.00/	21
			Retail Pork Chops	20.0%	20.0% 1	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	25.0% 2	0.0% 0	3.6% 1	0.0% 0	0.0% 0
		ne	HACCP	3.7% 14	3.8% 8	1.9% 6	4.3% 13	2.3% 7	3.3% 7	4.5% 5	4.2% 5	3.6% 4	2.2%		
		Swine	Cecal (Market Hogs)												1.9% 5
			Cecal (Sows)												2.4%
Cephems	Cefoxitin		Humans	4.3%	4.3%	3.4%	3.0%	3.5%	2.9%	3.0%	3.2%	2.6%	2.6%	2.7%	2.4%
	(MIC ≥ 32 μg/mI)	-	ı	86 10.0%	79 25.3%	61 24.8%	62 20.9%	77 18.4%	63 15.2%	72 21.2%	71 33.1%	63 28.7%	60 25.9%	61 22.7%	53 17.3%
		ens	Retail Chickens	6 8.7%	21 8.2%	39 12.4%	32 12.0%	28 12.8%	15 13.0%	42 8.0%	90 11.4%	49 11.3%	41 6.5%	52 8.6%	36 7.1%
		Chickens	HACCP	130	95	159	238	176	129	50	63	64	32	74	37
		Ľ	Cecal												3.6% 2
		"	Retail Ground Turkey	8.1% 6	2.6%	4.9% 7	7.1% 13	5.0% 8	5.3% 10	4.9% 12	5.7% 11	15.3% 31	17.9% 29	15.4% 14	8.5% 9
		Turkeys	HACCP	2.5%	1.1%	5.1%	3.5%	5.3%	9.2% 25	5.4%	12.4%	15.2%	11.7%	14.9%	9.2%
		₽	Cecal	6	3	12	8	16	23	8	15	23	12	26	7.1%
		$\vdash$	Retail Ground Beef	22.2%	40.0%	14.3%	0.0%	0.0%	0.0%	8.3%	14.3%	28.6%	0.0%	15.4%	20.0%
				2 15.9%	4 17.8%	2 13.2%	0 19.8%	0 17.7%	0 15.0%	2 14.7%	2 13.5%	20.6%	13.8%	2 10.4%	3 14.5%
		Cattle	HACCP	160	119	80	65	69	66	65	27	51	47	29	45 10.5%
		0	Cecal (Beef)												13
			Cecal (Dairy)												6.8% 21
			Retail Pork Chops	20.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0% 2	0.0%	10.7% 3	0.0%	0.0%
		e	HACCP	2.9%	4.3%	1.9%	3.7%	2.0%	2.8%	4.5%	4.2%	1.8%	2.2%		
		Swine	Cecal (Market Hogs)	11	9	6	11	6	6	5	5	2	2		1.9%
			Cecal (Sows)												2.4%
	Ceftiofur	-		4.4%	4.5%	3.4%	2.9%	3.6%	3.3%	3.1%	3.4%	2.8%	2.5%	2.9%	7 2.5%
	(MIC ≥ 8 μg/mI)	<u> </u>	Humans	87	83	60	59	79	70	73	75	69	58	64	55
		us	Retail Chickens	10.0% 6	25.3% 21	24.8% 39	20.9% 32	19.1% 29	16.2% 16	22.2% 44	37.1% 101	33.3% 57	34.2% 54	27.5% 63	19.7% 41
		Chickens	HACCP	10.2% 153	9.8% 113	12.4% 159	12.2% 242	12.8% 177	15.4% 153	8.7% 54	12.7% 70	12.1% 68	6.1% 30	10.2% 88	8.1% 42
		Ö	Cecal												7.3% 4
		H	Retail Ground Turkey	8.1%	2.6%	4.9%	7.1%	5.0%	5.3%	4.9%	5.7%	15.8%	20.4%	16.5%	9.4%
		Turkeys	HACCP	3.3%	1.5%	4.7%	13 3.5%	5.3%	10 11.1%	12 5.4%	11 12.4%	32 15.2%	33 11.7%	15 14.9%	10 10.3%
		Tur		8	4	11	8	16	30	8	15	23	12	26	9 7.1%
		<u> </u>	Cecal	22.2%	40.0%	14.3%	0.0%	0.0%	0.0%	8.3%	14.3%	28.6%	11.1%	15.4%	20.0%
			Retail Ground Beef	2	4	2	0	0	0	2	2	2	1	2	3
		#e	HACCP	17.4% 175	21.0% 141	13.3% 81	21.6% 71	18.8% 73	15.5% 68	16.3% 72	14.5% 29	21.5% 53	13.2% 45	11.1% 31	14.8% 46
		Cattle	Cecal (Beef)												10.5%
			Cecal (Dairy)												6.8%
		-		20.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%	7.1%	0.0%	21 0.0%
			Retail Pork Chops	3.2%	4.3%	1.9%	3.7%	2.0%	2.8%	0 4.5%	4.2%	1.8%	2.2%	0	0
		wine	HACCP	3.2% 12	1 4.3% 9	0 1.9% 6	3.7% 11	2.0% 6	2.8%	4.5% 5	4.2% 5	0 1.8% 2	2 2.2% 2	0	
		Swine		3.2%		1.9%	3.7%	2.0%	2.8%	4.5%	4.2%	1.8%	2.2%	0	2.3% 6 2.4%

Year	biai resistance and	ong a	all Non-Typhoidal S	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ed		Humans	1998	1855	1782	2005	2171	2145	2384	2193	2449	2335	2012	2013
		sue	Retail Chickens	60	83	157	153	152	99	198	272	171	158	229	208
		Chickens	HACCP	1500	1158	1280	1989	1380	994	624	551	564	491	864	520
		S	Cecal												55
		ırkey	Retail Ground Turkey HACCP	74 244	114 262	142 236	183 227	159 304	190 271	246 148	193 121	202 151	162 103	91 175	106 87
		1	Cecal												28
		<u>o</u>	Retail Ground Beef	9	10	14	8	19	13	24	14	7	9	13	15
		Cattle	HACCP Cecal (Beef)	1008	670	607	329	389	439	443	200	247	340	280	310 124
			Cecal (Dairy)												310
		e	Retail Pork Chops	10	5	11	9	8	18	23	8	20	28	12	24
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	379	211	308	301	304	211	111	120	111	90		260
	Antimicrobial		Cecal (Sows)												289
	(Resistance		Isolate												
Antimicrobial Class Cephems	Breakpoint) Ceftriaxone		Source	4.4%	4.4%	3.3%	2.9%	3.7%	3.3%	3.1%	3.4%	2.9%	2.5%	2.9%	2.5%
	(MIC ≥ 4 μg/mI)		Humans	87 10.0%	81 26.5%	59 24.8%	59 21.6%	80 19.1%	70 16.2%	73 22.2%	75 37.9%	70 34.5%	58 33.5%	64 27.9%	55 19.7%
		su	Retail Chickens	6	22	39	33	29	16	44	103	59	53	64	41
		Chickens	HACCP	9.9% 149	9.7% 112	12.3% 158	12.2% 242	12.8% 177	15.6% 155	8.7% 54	12.9% 71	11.9% 67	6.3% 31	11.2% 97	8.7% 45
		Ö	Cecal												7.3% 4
			Retail Ground Turkey	8.1%	2.6%	5.6%	7.1%	5.0%	5.8%	4.9%	5.7%	16.3%	22.2%	17.6%	9.4%
		eys	HACCP	3.3%	1.1%	8 4.7%	13 3.5%	5.3%	11 11.1%	12 5.4%	11 12.4%	33 15.2%	36 11.7%	16 16.0%	10 10.3%
		Turkeys		8	3	11	8	16	30	8	15	23	12	28	9 7.1%
			Cecal												2
			Retail Ground Beef	22.2%	40.0% 4	14.3% 2	0.0%	0.0%	0.0%	8.3% 2	14.3% 2	28.6% 2	11.1% 1	15.4% 2	26.7% 4
		<u>a</u>	HACCP	17.3% 174	21.0% 141	13.5% 82	20.7% 68	18.5% 72	15.9% 70	16.0% 71	14.5% 29	21.5% 53	14.4% 49	10.7% 30	14.8% 46
		Cattle	Cecal (Beef)	17-7	141	- OZ	- 00	12	70		23	33	73	50	10.5%
			Cecal (Dairy)												13 6.8%
				20.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%	7.1%	0.0%	21 0.0%
			Retail Pork Chops	2	1	0	0	0	0	0	2	0	2	0	0
		ine	HACCP	2.9% 11	4.3% 9	1.6% 5	3.7% 11	1.6% 5	2.4% 5	4.5% 5	4.2% 5	1.8% 2	2.2% 2		
		Š	Cecal (Market Hogs)												2.3% 6
			Cecal (Sows)												2.4% 7
Folate Pathway Inhibito	Sulfamethoxazole/		Humans	12.9%	15.1%	13.3%	12.6%	12.1%	12.3%	10.1%	9.9%	9.0%	8.6%	8.4%	10.3%
	Sulfisoxazole <sup>2</sup> (MIC ≥ 512 µg/ml)		ı	258 16.7%	280 14.5%	237 28.7%	256 17.0%	263 23.0%	264 25.3%	240 38.9%	217 48.2%	221 44.4%	201 44.9%	188 37.1%	225 33.7%
	, , ,	ens	Retail Chickens	10 8.9%	12 10.3%	45 11.9%	26 8.5%	35 10.7%	25 10.4%	77 13.3%	131 10.0%	76 12.4%	71 7.9%	85 14.4%	70 11.0%
		Chickens	HACCP	133	119	152	169	148	103	83	55	70	39	124	57
		0	Cecal												30.9% 17
			Retail Ground Turkey	20.3% 15	33.3% 38	28.2% 40	34.4% 63	32.1% 51	34.7% 66	27.6% 68	20.2% 39	24.8% 50	26.5% 43	27.5% 25	27.4% 29
		Turkeys	HACCP	30.3%	28.2%	36.4%	37.0%	27.3%	25.5%	24.3%	28.9%	25.2%	22.3%	22.3%	29.9%
		μ	Cecal	74	74	86	84	83	69	36	35	38	23	39	26 14.3%
				22.2%	40.0%	14.3%	25.0%	10.5%	7.7%	20.8%	35.7%	42.9%	0.0%	23.1%	4 40.0%
			Retail Ground Beef	2	4	2	2	2	1	5	5	3	0	3	6
		Cattle	HACCP	22.3% 225	25.1% 168	22.7% 138	27.4% 90	24.2% 94	21.6% 95	24.8% 110	24.5% 49	26.3% 65	20.0% 68	19.6% 55	20.6% 64
		ပိ	Cecal (Beef)												18.6% 23
			Cecal (Dairy)												9.0% 28
			Retail Pork Chops	70.0%	40.0%	18.2%	33.3%	75.0%	16.7%	30.4%	37.5%	50.0%	25.0%	33.3%	29.2%
			HACCP	7 34.6%	2 25.1%	2 37.0%	32.9%	6 26.6%	30.8%	7 31.5%	30.8%	10 28.8%	7 17.8%	4	7
		Swine		131	53	114	99	81	65	35	37	32	16		20.8%
		"	Cecal (Market Hogs)												54
			Cecal (Sows)												9.7% 28
	Trimethoprim- Sulfamethoxazole		Humans	1.4% 28	1.9% 36	1.7% 31	1.7% 34	1.7% 36	1.5% 33	1.6% 37	1.7% 38	1.6% 38	1.2% 28	1.3% 29	1.4% 31
	(MIC ≥ 4 / 76 μg/ml)		Retail Chickens	0.0%	0.0%	0.0%	0.0%	1.3%	0.0%	0.0%	0.4%	0.0%	1.3%	0.0%	0.0%
		Chickens	HACCP	0.8%	0.3%	0.2%	0.2%	0.1%	0.0%	0.3%	0.2%	0.0%	0.2%	0.5%	0.2%
		Chic		12	4	3	4	1	0	2	1	0	1	4	3.6%
		-	Cecal	1.4%	0.0%	0.0%	0.5%	0.0%	0.5%	0.4%	1.6%	0.0%	3.7%	0.0%	2 0.9%
		s/s	Retail Ground Turkey	1	0	0	1	0	1	1	3	0	6	0	1
		Turkeys	HACCP	2.5% 6	2.3% 6	0.8% 2	1.8% 4	1.0% 3	1.1% 3	1.4% 2	1.7% 2	0.0% 0	0.0% 0	0.6% 1	1.1% 1
		-	Cecal												0.0%
			Retail Ground Beef	0.0%	0.0%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			HACCP	2.5%	3.3%	1.5%	0 4.9%	0 4.6%	3.0%	0 4.5%	1.5%	0 4.5%	1.8%	1.1%	1.3%
		Cattle		25	22	9	16	18	13	20	3	11	6	3	2.4%
		0	Cecal (Beef)												3
		L	Cecal (Dairy)												0.6% 2
			Retail Pork Chops	20.0%	0.0%	0.0% 0	11.1% 1	50.0% 4	5.6% 1	0.0%	25.0% 2	0.0%	0.0%	0.0%	0.0%
		go.	HACCP	1.6%	2.4% 5	1.6% 5	2.3%	2.0%	1.9%	2.7%	2.5%	1.8%	0.0%		
		Swine	Cecal (Market Hogs)	0	3	,			-	3	3				0.8%
			Cecal (Sows)												1.0%
	l	1	Octai (SUWS)												3

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low <sup>2</sup> Sulfamethoxazole was tested from 1996-2003 and was replaced by sulfisoxazole in 2004

Table 14c. Antimicrobial Resistance among all Non-Typhoidal Salmonella Isolates, 2002-2013

Table 14d. Antimicrobial Resistance among all Non-Typhoidal Salmonella Isolates, 2002-2013

Year	obial Resistance am	ong	all Non-Typhoidal S	almonell 2002	a Isolate	s, 2002-2 2004		2006	2007	2008	2000	2010	2011	2012	2013
Number of Isolates Tes	ted		Humans	1998	1855	1782	<b>2005</b> 2036	<b>2006</b> 2171	<b>2007</b> 2145	<b>2008</b> 2384	<b>2009</b> 2193	2449	2335	<b>2012</b> 2233	2178
		ens	Retail Chickens	60	83	157	153	152	99	198	272	171	158	229	208
		Chickens	HACCP	1500	1158	1280	1989	1380	994	624	551	564	491	864	520
			Cecal												55
		Turkeys	Retail Ground Turkey HACCP	74 1008	114 670	142 607	183 329	159 389	190 439	246 443	193 200	202 247	162 340	91 280	106 310
		ī	Cecal												124
		в	Retail Ground Beef	9	10	14	8	19	13	24	14	7	9	13	15
		Cattle	HACCP Cecal (Beef)	1008	670	607	329	389	439	443	200	247	340	280	310 124
		Ĺ	Cecal (Dairy)												310
			Retail Pork Chops	10	5	11	9	8	18	23	8	20	28	12	24
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	379	211	308	301	304	211	111	120	111	90		200
		0	Cecal (Narket Hogs) Cecal (Sows)												260 289
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class	Breakpoint)		Source												
Macrolides	Azithromycin (MIC ≥32 µg/mI)		Humans										0.2% 5	0.0% 1	0.2% 5
		SL	Retail Chickens										0.6% 1	0.0%	0.0%
		Chickens	HACCP										0.0%	0.0%	0.0%
		ò	Cecal												0.0%
			Retail Ground Turkey										0.0%	0.0%	0.0%
		Turkeys	HACCP										0.0%	0.0%	0.0%
		Ţ	Cecal										0	0	0.0%
		-	Retail Ground Beef										0.0%	0.0%	0.0%
													0.3%	0.0%	0.0%
		Cattle	HACCP										1	0	0.0%
		0	Cecal (Beef)												0
			Cecal (Dairy)												0.0%
			Retail Pork Chops										0.0% 0	0.0%	0.0% 0
		Swine	HACCP										0.0%		
		Sw	Cecal (Market Hogs)												0.4%
			Cecal (Sows)												0.3%
Penicillins	Ampicillin		Humans	13.0%	13.6%	12.1%	11.3%	10.9%	10.1%	9.7%	9.8%	9.1%	9.1%	8.8%	10.4%
	(MIC ≥ 32 μg/ml)		Retail Chickens	259 16.7%	253 33.7%	216 30.6%	231 26.8%	237 22.4%	217 18.2%	232 28.3%	216 45.6%	223 38.0%	213 40.5%	196 29.3%	227 22.1%
		kens	HACCP	10 14.3%	28 13.7%	48 14.5%	41 14.0%	34 14.9%	18 17.0%	56 10.6%	124 13.8%	65 13.7%	64 7.3%	67 12.2%	46 10.4%
		Chickens		215	159	185	279	205	169	66	76	77	36	105	54 12.7%
			Cecal	40.00/	28.9%	20.4%	26.8%	25.00/	40.00/	E4 00/	E0.00/	40.00/	50.00/	40.7%	7 47.2%
		ş	Retail Ground Turkey	16.2% 12	33	29	49	25.8% 41	42.6% 81	51.2% 126	58.0% 112	48.0% 97	58.0% 94	37	50
		Turkeys	HACCP	18.0% 44	18.7% 49	22.0% 52	22.9% 52	25.3% 77	36.9% 100	32.4% 48	38.8% 47	44.4% 67	27.2% 28	42.3% 74	26.4% 23
		-	Cecal												35.7% 10
			Retail Ground Beef	22.2% 2	40.0% 4	21.4% 3	25.0% 2	10.5% 2	0.0%	12.5% 3	28.6% 4	28.6% 2	11.1% 1	23.1% 3	26.7% 4
		n	HACCP	23.9%	28.1%	19.3%	26.7%	22.4%	20.0%	21.7%	22.5%	26.3%	17.1%	15.4%	17.1%
		Cattle	Cecal (Beef)	241	188	117	88	87	88	96	45	65	58	43	53 14.5%
		1													18 8.1%
		<u> </u>	Cecal (Dairy)	40.0%	40.0%	9.1%	22.2%	25.0%	5.6%	13.0%	37.5%	15.0%	46.4%	16.7%	25 25.0%
		ĺ	Retail Pork Chops	4	2	1	2	2	1	3	3	3	13	2	6
		Swine	HACCP	13.7% 52	12.8% 27	16.2% 50	13.6% 41	11.5% 35	18.0% 38	14.4% 16	19.2% 23	17.1% 19	11.1% 10		
		Š	Cecal (Market Hogs)												9.6% 25
			Cecal (Sows)												3.5% 10
Phenicols	Chloramphenicol		Humans	8.6%	10.1%	7.6%	7.8%	6.4%	7.3%	6.1%	5.7%	5.0%	4.4%	3.9%	3.9%
	(MIC ≥ 32 μg/ml)		Retail Chickens	172 0.0%	187 2.4%	136 1.9%	159 0.7%	139 2.6%	1.0%	0.5%	0.0%	2.3%	103 0.6%	0.0%	0.5%
		Chickens	HACCP	2.4%	2.1%	1.3%	1.8%	1.7%	1.8%	1.8%	1.6%	3.0%	0.4%	0.6%	0.4%
		Chic		36	24	16	36	24	18	11	9	17	2	5	0.0%
		<u> </u>	Cecal	1.4%	0.9%	2.8%	0.5%	0.6%	1.6%	1.6%	1.6%	2.5%	3.7%	3.3%	0 2.8%
		λs	Retail Ground Turkey	1	1	4	1	1	3	4	3	5	6	3	3
		Turkeys	HACCP	5.3% 13	4.2% 11	4.7% 11	4.8% 11	3.9% 12	5.5% 15	2.7% 4	3.3% 4	4.6% 7	1.0% 1	1.1% 2	1.1% 1
		-	Cecal												0.0% 0
			Retail Ground Beef	22.2% 2	40.0% 4	14.3% 2	12.5% 1	5.3% 1	0.0%	12.5% 3	21.4%	42.9% 3	0.0%	23.1%	26.7% 4
			HACCP	20.6%	25.1%	17.6%	21.9%	19.8%	20.0%	19.6%	21.0%	25.1%	17.9%	15.0%	15.5%
		Cattle	Cecal (Beef)	208	168	107	72	77	88	87	42	62	61	42	48 12.9%
		Ĭ													16 7.4%
		<u> </u>	Cecal (Dairy)	40.000	40.000	40.000	00.000	0.00:	0.00:	0.051	40.50	45.000	47.00	0.051	23
		ĺ	Retail Pork Chops	40.0% 4	40.0% 2	18.2% 2	22.2% 2	0.0% 0	0.0% 0	0.0% 0	12.5% 1	15.0% 3	17.9% 5	0.0% 0	12.5% 3
		ne	HACCP	10.0% 38	8.5% 18	12.7% 39	10.6% 32	7.9% 24	15.2% 32	9.9% 11	15.0% 18	8.1% 9	4.4% 4		
		Swine	Cecal (Market Hogs)	- 55	.,	55			ÿ		.,	Ť			3.5%
		ĺ	Cecal (Sows)												2.4%
			Imonella because in prior												7

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 14e. Antimicrobial Res	rictanco amona all No	n-Tunhaidal Ca	Imanalla lealatae	2002-2012
Table 146. Allulliciobial Nes	sistance annong an ivo	ii-i ypiioiuai <i>3ai</i>	iiiiuliella isulales,	2002-2013

Table 14e. Antimicro	obial Resistance ame	ong a	all Non-Typhoidal S	almonell 2002	a Isolate	s, 2002-2	2013	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	sted		Humans	1998	1855	1782	2036	2171	2145	2384	2193	2449	2335	2233	2178
		Chickens	Retail Chickens HACCP	60 1500	83 1158	157 1280	153 1989	152 1380	99 994	198 624	272 551	171 564	158 491	229 864	208 520
		_	Cecal Retail Ground Turkey	7.4	444	440	400	450	400	0.40	400	202	400	04	55
		Turkeys	HACCP Cecal	74 244	114 262	142 236	183 227	159 304	190 271	246 148	193 121	202 151	162 103	91 175	106 87 28
		Cattle	Retail Ground Beef HACCP Cecal (Beef)	9 1008	10 670	14 607	8 329	19 389	13 439	24 443	14 200	7 247	9 340	13 280	15 310
			Cecal (Dairy)  Retail Pork Chops	10	5	11	9	8	18	23	8	20	28	12	124 310 24
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs) Cecal (Sows)	379	211	308	301	304	211	111	120	111	90	12	260 289
Antimicrobial Class	Antimicrobial (Resistance Breakpoint)		Isolate Source												
Quinolones	Ciprofloxacin (MIC ≥ 1 µg/mI)		Humans	0.1%	0.2%	0.3% 5	0.1%	0.1% 3	0.1%	0.2% 5	0.3% 7	0.2% 6	0.2%	0.3% 7	0.5% 11
	(WIIO 2 1 pg/III)	"0	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		5	Cecal		,	U	0	0	U	0	U	0	0	U	0.0%
			Retail Ground Turkey	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys	HACCP	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		12	Cecal		0	U	U	0	U	0	U	0	0	U	0.0%
			Retail Ground Beef	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Ф	HACCP	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%
		Cattle	Cecal (Beef)	U	U	0	U		U	U	U	U		U	0.0%
			Cecal (Dairy)												0.3%
			Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Ф	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0
		Swine	Cecal (Market Hogs)	0	0	0	0	0	0	0	0	0	0		0.4%
			Cecal (Sows)												0.3%
	Nalidixic Acid	-	Humans	1.6%	1.9%	2.2%	1.9%	2.4%	2.2%	2.1%	1.8%	2.0%	2.2%	2.4%	2.8%
	(MIC ≥ 32 μg/mI)		Retail Chickens	0.0%	36 1.2%	39 0.0%	38 0.7%	52 0.7%	0.0%	0.0%	39 0.4%	0.0%	51 0.0%	54 0.0%	61 0.0%
		Chickens	HACCP	0.8%	0.4%	0.5%	0.3%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
		Ş	Cecal	12	5	6	6	2	1	0	0	0	0	1	0.0%
			Retail Ground Turkey	8.1%	4.4%	0.0%	1.1%	0.0%	2.6%	0.4%	0.0%	0.5%	0.0%	0.0%	0.0%
		Turkeys	HACCP	5.3%	5 3.8%	2.1%	2.2%	0.7%	5 1.1%	0.7%	0.8%	0.7%	0.0%	1.7%	1.1%
		Ţ	Cecal	13	10	5	5	2	3	1	1	1	0	3	0.0%
			Retail Ground Beef	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.3%	0.0%	0.0%	0.0%	0.0%
			HACCP	0.4%	0.4%	2.0%	1.5%	0.5%	0.7%	0.7%	1.0%	2.8%	1.8%	3.6%	2.3%
		Cattle	Cecal (Beef)	4	3	12	5	2	3	3	2	7	6	10	7 1.6%
			Cecal (Dairy)												0.3%
			Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		_	HACCP	0.3%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0
		Swine	Cecal (Market Hogs)	1	0	0	1	0	0	0	0	0	0		1.2%
			Cecal (Narket Hogs)												3 0.7%
Tetracyclines	Tetracycline	$\vdash$	Humans	14.9%	16.3%	13.6%	13.9%	13.5%	14.5%	11.5%	11.9%	11.0%	10.5%	11.1%	2 12.6%
	(MIC ≥ 16 μg/mI)	$\vdash$	Retail Chickens	298 33.3%	302 27.7%	242 46.5%	282 43.8%	293 46.7%	310 41.4%	275 46.5%	261 60.3%	270 56.7%	245 65.8%	247 48.5%	275 49.0%
		kens	HACCP	20 24.9%	23 26.2%	73 27.4%	67 28.3%	71 31.8%	41 35.5%	92 30.4%	164 33.9%	97 41.8%	104 40.9%	111 33.7%	102 42.7%
		Chickens	Cecal	374	303	351	563	439	353	190	187	236	201	291	222 38.1%
		-	Retail Ground Turkey	55.4%	39.5%	56.3%	39.9%	56.0%	67.4%	66.3%	64.8%	54.0%	64.8%	45.1%	21 62.3%
		eys	,	41 54.5%	45 58.8%	80 48.3%	73 54.6%	89 61.8%	128 73.8%	163 64.2%	125 63.6%	109 57.6%	105 45.6%	41 46.3%	66 43.7%
		Turkeys	HACCP	133	154	114	124	188	200	95	77	87	47	81	38 46.4%
		-	Cecal  Potail Ground Boof	22.2%	40.0%	14.3%	12.5%	21.1%	0.0%	20.8%	42.9%	42.9%	44.4%	23.1%	13 46.7%
		1	Retail Ground Beef	4 32.0%	4 36.9%	2 31.8%	1 34.0%	4 30.3%	0 27.3%	5 29.3%	6 29.0%	33.6%	4 30.6%	3 28.9%	7 24.8%
				323	247	193	112	118	120	130	58	83	104	81	77 29.0%
		attle	HACCP	323											
		Cattle	Cecal (Beef)	323											36 12.3%
		Cattle	Cecal (Beef) Cecal (Dairy)		90.00/	E4 F0/	EE 00/	25.00/	E0.00/	24.00/	27.50/	4E 00/	20.20/	44 70/	12.3% 38
		Cattle	Cecal (Beef) Cecal (Dairy) Retail Pork Chops	70.0% 7	80.0%	54.5%	55.6% 5	25.0%	50.0%	34.8%	37.5%	45.0% 9	39.3%	41.7%	12.3%
			Cecal (Beef) Cecal (Dairy)	70.0%											12.3% 38 45.8% 11
		Swine Cattle	Cecal (Beef) Cecal (Dairy) Retail Pork Chops	70.0% 7 57.8%	4 43.1%	6 58.8%	5 54.8%	2 62.8%	9 54.5%	8 51.4%	3 53.3%	9 51.4%	11 41.1%		12.3% 38 45.8%

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

## **Ceftriaxone Resistance**

Table 15. Ceftriaxone-Resistant Non-Typhoidal Salmonella Isolates, 2012

	Humans					C	hicke	ns			
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Humans	Typhimurium	17	26.6	Retail	Typhimurium	49	76.6	HACCP	Kentucky	55	56.7
(N=64)	Newport	16	25.0	Chickens	Kentucky	13	20.3	(N=97)	Typhiumurium	30	30.9
	Heidelberg	9	14.1	(N=64)	I 4,[5],12:i:-	2	3.1		Heidelberg	6	6.2
	Dublin	6	9.4						I 4,[5],12:i:-	2	2.1
	Agona	3	4.7						4:i:-	1	1.0
	Enteritidis	2	3.1						I 8,20:-:z6	1	1.0
	Infantis	2	3.1						Litchfield	1	1.0
	Schwarzengrund	2	3.1						Enteritidis	1	1.0
	I 4,[5],12:i:-	1	1.6								
	Albert	1	1.6				Turkey	rs			
	Berta	1	1.6	Source	Serotype	n	%	Source	Serotype	n	%
	Blockley	1	1.6								
	Choleraesuis	1	1.6	Retail	Infantis	3	18.8	HACCP	Albany	10	35.7
	Derby	1	1.6	<b>Ground Turkey</b>	Agona	2	12.5	(N=28)	Agona	3	10.7
	Saintpaul	1	1.6	(N=16)	Albany	2	12.5		Berta	2	7.1
					Schwarzengrund	2	12.5		Heidelberg	2	7.1
					Typhimurium	2	12.5		Typhimurium	2	7.1
					Berta	1	6.3		Senftenberg	2	7.1
					Javiana	1	6.3		Altona	1	3.6
					Montevideo	1	6.3		Anatum	1	3.6
					Newport	1	6.3		Bredeney	1	3.6
					Saintpaul	1	6.3		Kentucky	1	3.6
									Muenchen	1	3.6
									Tennessee	1	3.6
									Uganda	1	3.6
							Cattle				
				Source	Serotype	n	%	Source	Serotype	n	%
					Dublin	2	100.0	НАССР	Dublin	20	66.7
				Retail Ground Beef	Dubiiii	2	100.0	(N=30)	Montevideo	20	6.7
				(N=2)				(11-00)		2	6.7
				,					Newport	2	6.7
									Reading	2	6.7
									Typhimurium Kentucky	1	3.3
										1	3.3
									Poona	ı	3.3
							Swine	<u>.                                    </u>			
				Source	Serotype	n	%	Source	Serotype	n	%
				Retail Pork Chops (N=0)				HACCP <sup>1</sup> (N=0)			

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample pork products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

## Ceftriaxone Resistance

. 4610 10	6. Ceftriaxone-R	25,514		. , priordar oa		,			Chiales						
	Humans								Chickens						
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Humans	Dublin	11	20.0	Retail	Typhimurium	34	82.9	HACCP	Kentucky	34	75.6	Cecal	Typhimurium	2	50.0
(N=55)	Newport	11	20.0	Chickens	Kentucky	7	17.1	(N=45)	Typhimurium	5	11.1	(N=4)	Heidelberg	1	25.0
	Typhimurium	11	20.0	(N=41)					Heidelberg	3	6.7		Kentucky	1	25.0
	Heidelberg	9	16.4						Infantis	2	4.4				
	Infantis	5	9.1						I 4,[5],12:i:-	1	2.2				
	I 4,[5],12:i:-	2	3.6												
	Agona	1	1.8						Turkeys			•			
	Berta	1	1.8	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
	Enteritidis	1	1.8							-					
	Kentucky	1	1.8	Retail	Heidelberg	5	50.0	HACCP	Heidelberg	4	44.4	Cecal	Albany	2	100.0
	Senftenberg	1	1.8	Ground Turkey	Albany	2	20.0	(N=9)	Albany	3	33.3	(N=2)	Albany	-	100.0
	Unknown	1	1.8	(N=10)	Brandenburg	1	10.0		Senftenberg	1	11.1				
	Unknown		1.0	(,											
					Bublin	1	10.0		Hadar	1	11.1				
					Infantis	1	10.0								
									Cattle			<u> </u>			
				Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
				Source	Serotype		70	Source	Serotype		70	Source	Serotype		70
				Retail	D. A.F.		100.0	HACCP	Dublin	40	39.1	Cecal	Newport		46.2
				Ground Beef	Dublin	4	100.0	(N=46)		18		(Beef)		6	
				(N=4)				()	Newport	10	21.7	(N=13)	Typhimurium	3	23.1
				, ,					Typhimurium	7	15.2	, ,	Dublin	1	7.7
									Reading	5	10.9		Heidelberg	1	7.7
									Montevideo	2	4.3		Montevideo	1	7.7
									Albany	1	2.2		Uganda	1	7.7
									Berta	1	2.2				
									Heidelberg	1	2.2				
									Ohio	1	2.2	Cecal	Typhimurium	11	52.4
												(Dairy)	Newport	5	23.8
												(N=21)	Montevideo	2	9.5
													Anatum	1	4.8
													Give	1	4.8
													Ohio	1	4.8
									Swine						
				Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
				Retail				HACCP <sup>1</sup>				Cecal	Infantis	2	33.3
				Pork Chops				(N=0)				(Market Hogs)	Give	1	16.7
				(N=0)								(N=6)	Johannesburg	1	16.7
													Newport	1	16.7
													Typhimurium	1	16.7
													-,,		
												Cecal	Agona	2	28.6
												(Sows)	-	2	28.6
												(N=7)	Heidelberg	2	
															28.6
													Infantis Reading	1	14.3

<sup>1</sup> In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

## **Nalidixic Acid Resistance**

Table 17. Naldixic Acid-Resistant Non-Typhoidal Salmonella Isolates, 2012

	Humans					С	hicke	ns			
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Humans (N=54)	Enteritidis	28	51.9	Retail				HACCP (N=1)	Hadar	1	100.0
(N=54)	Typhimurium	5	9.3	Chickens (N=0)				(N=1)			
	Infantis	4	7.4	(N=0)							
	Kentucky	3	5.6								
	Schwarzengrund	2	3.7			1	Гurkey				
	I 4,[5],12:-:1,2	1	1.9	Source	Serotype	n	%	Source	Serotype	n	%
	I 6,7:r:-	1	1.9								
	IIIa 50:z4,z23:-	1	1.9	Retail				HACCP	Saintpaul	3	100.0
	Agona	1	1.9	Ground Turkey				(N=3)			
	Albert	1	1.9	(N=0)							
	Choleraesuis	1	1.9								
	Dublin	1	1.9				Cattle	)			
	Hadar	1	1.9	Source	Serotype	n	%	Source	Serotype	n	%
	Poona	1	1.9								
	Saintpaul	1	1.9	Retail				HACCP	Dublin	9	90.0
	Senftenberg	1	1.9	Ground Beef				(N=10)	Typhimurium	1	10.0
	Unknown serotype	1	1.9	(N=0)							
							Swine	•			
				Source	Serotype	n	%	Source	Serotype	n	%
				Retail							
l				Pork Chops				HACCP <sup>1</sup>			
				(N=0)				(N=0)			

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample pork products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

## Nalidixic Acid Resistance

	Humans								Chickens						
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Humans	Enteritidis	22	36.1	Retail Chickens				HACCP (N=0)				Cecal (N=0)			
(N=61)	Typhimurium	5	8.2	(N=0)				(N=U)				(N=U)			
	Infantis	4	6.6	(,											
	Javiana	4	6.6												
	Kentucky	3	4.9						Turkeys						
	Paratyphi B var. L(+) tartrate+	3	4.9	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
	Agona	2	3.3												
	Choleraesuis	2	3.3	Retail				HACCP (N=1)	I 4,[5],12:i:-	1	100.0	Cecal (N=0)			
	Saintpaul	2	3.3	Ground Turkey (N=0)				(14=1)				(N=U)			
	I 4,[5],12:i:-	1	1.6	(N=U)											
	Anatum	1	1.6												
	Bredeney	1	1.6						Cattle						
	Dublin	1	1.6	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
	Indiana	1	1.6												
	London	1	1.6	Retail Ground Beef				HACCP (N=7)	Dublin	4	57.1	Cecal (Beef)	Heidelberg	1	50.0
	Mbandaka	1	1.6	(N=0)				(N=7)	Typhimurium	2	28.6	(N=2)	Muenster	1	50.0
	Montevideo	1	1.6	(,					Reading	1	14.3	( =)			
	Muenster	1	1.6												
	Oranienburg	1	1.6												
	Uganda	1	1.6									Cecal	Give	1	100.0
	Unknown serotype	1	1.6									(Dairy) (N=1)			
	Partially serotyped	1	1.6									()			
	Rough/Nonmotile isolates	1	1.6												
									Swine						
				Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
				Retail									_		
				Pork Chops				HACCP <sup>1</sup>				Cecal (Market Hogs)	Anatum	1	33.3
				(N=0)				(N=0)				(N=3)	Give	1	33.3
				, ,								, ,	Typhimurium	1	33.3
												Cecal (Sows)	Heidelberg	1	50.0
								I				(Sows) (N=2)	Senftenberg	1	50.0

In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

#### Resistance among the Top Non-Typhoidal Salmonella Serotypes

Table 19. Number of Non-Typhoidal Salmonella Isolates among the Top Serotypes from Humans with the Number of Resistant Isolates by Class and Agent, 2012

					Nun	ber c	f Isol	ates						Num	ber o	of Resis	stant Is	olates b	y Antimicrobial	Class and Ag	jent <sup>1</sup>			
					ses t	o whi		crobial olates a		Amin	oglyco	sides	β-Lactam/β- Lactamase Inhibitor Combinations	С	ephe	ems	Pat	olate hway bitors	Macrolides	Penicillins	Phenicols	Quine	olones	Tetracyclines
Sources	Salmonella Serotype	No. of Isolates	% of Isolates	0	1	2-3	4-5	6-7	8-9	GEN	KAN	STR	AMC	FOX	TIC	OXA	FIS	COT	AZI	AMP	CHL	CIP	NAL	TET
	Enteritidis	364	16.3%	321	25	12	6					7	2	2	2	2	10	4		15	2		28	13
	Typhimurium	296	13.3%	203	6	25	50	10	2	9	6	71	17	16	17	17	80	5		70	54	1	5	80
	Newport	258	11.6%	240	1	7		10				10	16	16	16	16	10	1		18	10			11
	Javiana	134	6.0%	131	1	2						1					1			2	1			1
	I 4,[5],12:i:-	117	5.2%	73	7	6	31			3		34	2	1	1	1	34			34				39
	Infantis	90	4.0%	83	3	2	1	1			2		1	1	2	2	3	4		2	1		4	4
ω	Montevideo	60	2.7%	56	3	1				1		1					1							3
Humans	Muenchen	58	2.6%	56		2						1					2							1
훈	Oranienburg	50	2.2%	50																				
	Saintpaul	50	2.2%	42	2	4	1	1		2		1			1	1	5	4		3	1	1	1	7
	Bareilly	49	2.2%	47	1	1											1	1		1				1
	Unknown serotype	19	0.9%	17	1		1					1					1			1			1	1
	Partially serotyped	26	1.2%	24			2					2					2			2	1			2
	Rough/Nonmotile isolates	7	0.3%	5	2														1					1
	Other	655	29.3%	544	25	65	6		3	11	16	58	27	25	25	25	38	10		48	17	5	15	83
	Total	2233	100.0%	1892	77	127	98	34	5	26	24	187	65	61	64	64	188	29	1	196	87	7	54	247

GEN= Gentamicin, KAN= Kanamycin, STR= Streptomycin, AMC= Amoxicillin/Clavulanic Acid, FOX= Cefoxitin, TIO= Ceftiofur, AXO= Ceftriaxone, FIS= Sulfisoxazole, COT= Trimethoprim/Sulfamethoxazole, AZI= Azithromycin, AMP= Ampicillin, CHL= Chloramphenicol, CIP= Ciprofloxacin, NAL= Nalidixic Acid, TET= Tetracycline

Table 20. Number of Non-Typhoidal Salmonella Isolates among the Top Serotypes from Chickens with the Number of Resistant Isolates by Class and Agent, 2012

						Nun	ber o	of Isola	ates					Num	ber o	of Resis	tant Isolat	es by Antimicrob	ial Class and Ag	gent <sup>1</sup>		
							o whi		crobial lates are	Amin	oglyco	sides	β-Lactam/β- Lactamase Inhibitor Combinations	С	ephe	ms	Folate Pathwa Inhibite	y Macrolide	s Penicillins	Phenicols	Quinolones	Tetracyclines
Sou	rces	Salmonella Serotype	No. of Isolates	% of Isolates	0	1	2-3	4-5	6-7 8-9	GEN	KAN	STR	AMC	FOX	TIC	AXO	FIS C	OT AZI	AMP	CHL	CIP NAL	TET
		Typhimurium	88	38.4%	8	1	30	37	12	6	9	13	49	40	49	49	79		50			78
	ွှ	Kentuckly	62	27.1%	7	23	18	13	1	4		54	13	10	12	13	3		14			25
	cker	Enteritidis	26	11.4%	26																	
	Chic	Heidelberg	17	7.4%	17																	
	etail (	Thompson	11	4.8%	11																	
	2eta	I 4,[5],12:i:-	6	2.6%	3	1			2		2		2	2	2	2	2		2			3
ens	-	Other	19	8.3%	13	4	2			2		3					1		1			5
Chickens		Total	229	100.0%	85	29	50	50	15	12	11	70	64	52	63	64	85		67			111
ਠ		Kentucky	301	34.8%	45	38	187	30	1	8		226	55	44	47	55	11	3	58			178
		Enteritidis	203	23.5%	195	4	4					3	1	1	1	1			5			3
	CCP	Typhimurium	105	12.2%	16	1	58	27	3	4	6	9	31	19	29	30	86	1	29			86
	¥C	Heidelberg	81	9.4%	62	4	10	2	3	11	4	10	6	5	6	6	11		8	5		10
	1	Infantis	31	3.6%	26		5			5		3					5					
		Other	143	16.6%	105	18	18	1	1	12	3	26	5	5	5	5	11		5		1	14
		Total	864	100.0%	449	65	282	60	8	40	13	277	98	74	88	97	124	4	105	5	1	291

<sup>1</sup> GEN= Gentamicin, KAN= Kanamycin, STR= Streptomycin, AMC= Amoxicillin/Clavulanic Acid, FOX= Cefoxitin, TIO= Ceftiofur, AXO= Ceftriaxone, FIS= Sulfisoxazole, COT= Trimethoprim/Sulfamethoxazole, AZI= Azithromycin, AMP= Ampicillin, CHL= Chloramphenicol, CIP= Ciprofloxacin, NAL= Nalidixic Acid, TET= Tetracycline

Table 21. Number of Non-Typhoidal Salmonella Isolates among the Top Serotypes from Turkeys with the Number of Resistant Isolates by Class and Agent, 2012

					Nu	nber (	of Iso	lates						Nun	nber	of Re	esist	ant Isolates b	y Antimicrobial	Class and Ag	ent <sup>1</sup>		
						to wh		nicrob solate:		Amii	noglyd	osides	β-Lactam/β- Lactamase Inhibitor Combinations	c	Seph	ems		Folate Pathway Inhibitors	Macrolides	Penicillins	Phenicols	Quinolones	Tetracyclines
Sources	Salmonella Serotype	No. of Isolates	% of Isolates	0	1	2-3	4-5	6-7	8-9	GEN	KAN	STR	AMC	FOX	( TIC	KA C	Ю	FIS COT	AZI	AMP	CHL	CIP NAL	TET
	IIIa 18:z4,z23:-	16	17.6%	16																			
	Saintpaul	9	9.9%	1		8				4		4	1	1	1	1	1	1		8			6
	Typhimurium	9	9.9%	4		1	2	2		1	1	5	2	1	2	2	2	5		4			4
	Hadar	8	8.8%			6	2			3		8						3		2			7
	Agona	7	7.7%			6		1		5	1	5	2	2	2	2	2	6		3			1
Turkey	Schwarzengrund	7	7.7%	2	1	2	2				2	2	2	2	2	2	2			2			3
Į	Heidelberg	5	5.5%			4	1			5		4						1		5			5
<u> </u>	Enteritidis	4	4.4%	3		1						1											1
puno	Reading	4	4.4%	3		1					1	1								1			1
ច	Infantis	3	3.3%					3		3	3	3	3	3	3	. 3	3	3		3	3		3
Retail	Albany	2	2.2%			2							2	2	2	2	2			2			
Se e	Anatum	2	2.2%			2				2		2								2			2
SS	Brandenburg	2	2.2%	1		1					1	1						1					1
Turkeys	Newport	2	2.2%	1				1		1	1	1	1	1	1	1	1	1		1			1
₽	Senftenberg	2	2.2%			2					1	1						1		1			1
	Other	9	9.9%	1	2	5	1				1	2	3	2	2	3	3	3		3			5
	Total	91	100.0%	32	3	41	8	7		24	12	40	16	14	15	5 1	6	25		37	3		41
	Hadar	31	17.7%	1	1	29				1	1	29						1		10			30
	Heidelberg	19	10.9%	5	2	9	2	1		11	6	12	2	2	2	2	2	4		11			11
	Albany	15	8.6%	4	1	9	1			1			9	9	9	1	0			10			1
١ ١,	Saintpaul	11	6.3%	2		5	4			9	2	7						4		9		3	6
SCP	Schwarzengrund	11	6.3%	7	2	2				0	1	1						2					4
I Iĕ	Senftenberg	11	6.3%	2		7	1	1		7	3	2	2	2	2	2	2	1		9			1
	Agona	10	5.7%	2		7		1		3	1	2	3	3	3	. 3	3	6		4			3
	Muenchen	10	5.7%	7		3							1	1	1	1	1	2		1			2
	Other	57	32.5%	21	6	20	8	2		11	7	14	10	9	9	1	0	19 1		20	2		23
	Total	175	100.0%	51	12	91	16	5		43	21	67	27	26	26	3 2	8	39 1		74	2	3	81

<sup>&</sup>lt;sup>1</sup> GEN= Gentamicin, KAN= Kanamycin, STR= Streptomycin, AMC= Amoxicillin/Clavulanic Acid, FOX= Cefoxitin, TIO= Ceftiofur, AXO= Ceftriaxone, FIS= Sulfisoxazole, COT= Trimethoprim/Sulfamethoxazole, AZI= Azithromycin, AMP= Ampicillin, CHL= Chloramphenicol, CIP= Ciprofloxacin, NAL= Nalidixic Acid, TET= Tetracycline

Table 22. Number of Non-Typhoidal Salmonella Isolates among the Top Serotypes from Cattle with the Number of Resistant Isolates by Class and Agent, 2012

					Nur	nber (	of Isol	lates						Nun	nber	of Resi	stant Is	solates by	y Antimicrobial	Class and Ag	ent <sup>1</sup>			
						to wh		icrobi olates		Amir	noglyco	osides	β-Lactam/β- Lactamase Inhibitor Combinations	c	Cephe	ems	Pa	olate thway ibitors	Macrolides	Penicillins	Phenicols	Quinc	olones	Tetracyclines
Sources	Salmonella Serotype	No. of Isolates	% of Isolates	0	1	2-3	4-5	6-7	8-9	GEN	KAN	STR	AMC	FOX	CTIC	OXA (	FIS	COT	AZI	AMP	CHL	CIP	NAL	TET
	Dublin	4	30.8%	1			1	2			2	3	2	2	2	2	3			3	3			3
	Cerro	2	15.4%	2																				
Beef	Agona	1	7.7%		1						1													
	Anatum	1	7.7%	1																				
Ground	Infantis	1	7.7%	1																				
	Kentucky	1	7.7%	1																				
Retail	Montevideo	1	7.7%	1																				
8	Newport	1	7.7%	1																				
	Typhimurium	1	7.7%	1																				
	Total	13	100.0%	9	1		1	2			3	3	2	2	2	2	3			3	3			3
ø	Montevideo	84	30.0%	66	13	3		2			3	2	2	2	2	2	2			2	2			18
Cattle	Dublin	30	10.7%	1	1	1	6	17	4	4	16	23	21	20	21	20	26			23	26		9	28
٥	Anatum	18	6.4%	18																				
	Typhimurium	16	5.7%	6		3	4	3		1	3	8	2	2	2	2	10	1		6	7		1	10
	Cerro	14	5.0%	14																				
<u>.</u>	Muenchen	13	4.6%	11		2						1					2							2
HACCP	Kentucky	12	4.3%	9	1	1	1					1	1		1	1	1			1				2
I	Meleagridis	12	4.3%	12																				
	Muenster	7	2.5%	6			1					1					1	1			1			1
	Mbandaka	5	1.8%	5																				
	Newport	5	1.8%	1			2	2				4	2	2	2	2	4			3	2			4
	Other	64	22.9%	46	5	7	5	2		1	3	13	3	3	3		9	1		8	4			16
	Total	280	100.0%	_		17			4	6	25	53	31			30	55	3		43	42		10	81

<sup>1</sup> GEN= Gentamicin, KAN= Kanamycin, STR= Streptomycin, AMC= Amoxicillin/Clavulanic Acid, FOX= Cefoxitin, TIO= Ceftiofur, AXO= Ceftriaxone, FIS= Sulfisoxazole, COT= Trimethoprim/Sulfamethoxazole, AZI= Azithromycin, AMP= Ampicillin, CHL= Chloramphenicol, CIP= Ciprofloxacin, NAL= Nalidixic Acid, TET= Tetracycline

Table 23. Number of Non-Typhoidal Salmonella Isolates among the Top Serotypes from Swine with the Number of Resistant Isolates by Class and Agent, 2012

						Nun	nber o	f Isol	lates							Number of Resis	tant Isolates b	y Antimicrobial	Class and Ag	jent <sup>1</sup>			
								ch Is	icrobial olates a		Ami	inogly	ycosi	ides	β-Lactam/β- Lactamase Inhibitor Combinations	Cephems	Folate Pathway Inhibitors	Macrolides	Penicillins	Phenicols	Quin	olones	Tetracyclines
Sour	ces	Salmonella Serotype	No. of Isolates	% of Isolates	0	1	2-3	4-5	6-7	8-9	GEN	N KA	AN :	STR	AMC	FOX TIO AXO	FIS COT	AZI	AMP	CHL	CIP	NAL	TET
		Typhimurium	6	50.0%	3		2	1						3			3		1				1
	sdo	Derby	1	8.3%			1							1			1						1
	Cho	Heidelberg	1	8.3%			1				1								1				1
	Pork	Infantis	1	8.3%	1																		
Š	il Pc	Kentucky	1	8.3%		1								1									
		London	1	8.3%		1																	1
	Ř	Reading	1	8.3%		1																	1
		Total	12	100.0%	4	3	4	1			1	,		5			4		2	•			5

GEN= Gentamicin, KAN= Kanamycin, STR= Streptomycin, AMC= Amoxicillin/Clavulanic Acid, FOX= Cefoxitin, TIO= Ceftiofur, AXO= Ceftriaxone, FIS= Sulfisoxazole, COT= Trimethoprim/Sulfamethoxazole, AZI= Azithromycin, AMP= Ampicillin, CHL= Chloramphenicol, CIP= Ciprofloxacin, NAL= Nalidixic Acid, TET= Tetracycline

Table 24. Number of Non-Typhoidal Salmonella Isolates among the Top Serotypes from Humans with the Number of Resistant Isolates by Class and Agent, 2013

					Nun	nber c	of Isola	ates						Nun	ber (	of Resis	stant Is	olates b	y Antimicrobial	Class and Age	Class and Agent <sup>1</sup>					
						o whi		crobial plates a		Amine	oglyco	sides	β-Lactam/β- Lactamase Inhibitor Combinations	С	ephe	ms	Patl	late nway pitors	Macrolides	Penicillins	Phenicols	Quine	olones	Tetracyclines		
Sources	Salmonella Serotype	No. of Isolates	% of Isolates	0	1	2-3	4-5	6-7	8-9	GEN	KAN	STR	AMC	FOX	TIO	AXO	FIS	COT	AZI	AMP	CHL	CIP	NAL	TET		
	Enteritidis	382	17.5%	334	31	11	5	1				10			1	1	6	2		22	1		22	17		
	Typhimurium	325	14.9%	226	25	26	40	8		4	1	67	11	11	11	11	68	4		54	44		5	69		
	Newport	209	9.6%	192	5	2		10		1	1	12	11	11	11	11	10	1		13	10			13		
	Javiana	140	6.4%	126	12	2						6	1							1			4	4		
	I 4,[5],12:i:-	127	5.8%	50	8	7	60	2		6	1	68	2	2	2	2	68	3	2	63	3	1	1	70		
	Infantis	76	3.5%	62	5	5	1	3		3	3	3	3	3	5	5	7	3		7	3		4	10		
S.	Heidelberg	60	2.8%	28	1	26	4	1		13	16	24	8	9	9	9	9	1		20	4			20		
Humans	Muenchen	59	2.7%	58		1						1					1							1		
훈	Saintpaul	56	2.6%	44	6	6				3		5					4	1		4			2	7		
	Montevideo	53	2.4%	51	2												1	1					1			
	Braenderup	44	2.0%	44																						
	Unknown serotype	36	1.7%	28	2	3	3			2		5	1	1	1	1	4			6		1	1	4		
	Partially serotyped	13	0.6%	11		1	1			1	2	2		1			1		1	1		1	1	1		
	Rough/Nonmotile isolates	6	0.3%	4	1		1					1					1	1	1	1			1			
	Other	592	27.2%	502	32	31	11	14	2	10	11	47	16	15	15	15	45	14	1	35	20	8	19	59		
	Total	2178	100.0%	1760	130	121	126	39	2	43	35	251	53	53	55	55	225	31	5	227	85	11	61	275		

GEN= Gentamicin, KAN= Kanamycin, STR= Streptomycin, AMC= Amoxicillin/Clavulanic Acid, FOX= Cefoxitin, TIO= Ceftiofur, AXO= Ceftriaxone, FIS= Sulfisoxazole, COT= Trimethoprim/Sulfamethoxazole, AZI= Azithromycin, AMP= Ampicillin, CHL= Chloramphenicol, CIP= Ciprofloxacin, NAL= Nalidixic Acid, TET= Tetracycline

Table 25. Number of Non-Typhoidal Salmonella Isolates among the Top Serotypes from Chickens with the Number of Resistant Isolates by Class and Agent, 2013

					Nun	nber o	f Isol	ates						Nur	mbe	r of F	Resist	tant Iso	olates b	y Antimicrobial	Class and Ag	ent <sup>1</sup>			
							ch Isc	crobial plates are	A	mino	glyco	sides	β-Lactam/β- Lactamase Inhibitor Combinations		Ceph	ems		Path	late way oitors	Macrolides	Penicillins	Phenicols	Quir	nolones	Tetracyclines
Source	s Salmonella Serotype	No. of Isolates	% of Isolates	0	1	2-3	4-5	6-7 8-	9 GI	EN I	KAN	STR	AMC	FOX	( TI	O A	хо	FIS	СОТ	AZI	AMP	CHL	CIP	NAL	TET
	Typhimurium	68	32.7%	5		26	24	13	- 3	3	17	3	34	30	3	4 3	34	63			38				63
و	Kentucky	44	21.2%	6	10	22	6					35	7	6	7	7	7				7				28
١	Heidelberg	28	13.5%	20		7	1		6	6	6	8						5			1	1			7
į	Enteritidis	25	12.0%	25																					
	Schwarzengrund	11	5.3%	2	9							9													
ģ	Infantis	8	3.8%	7		1												1							
Ω	Other	24	11.5%	19	2	3						3						1							4
	Total	208	100.0%	84	21	59	31	13	1	1	23	58	41	36	4	1 4	41	70			46	1			102
	Kentucky	237	45.6%	31	29	149	27	1	- 2	2	1	192	35	30	3	1 :	34	5	1		35	1			167
	Enteritidis	79	15.2%	76		2	1					2						2			3				2
SI G	Typhimurium	55	10.6%	13		37	5			2	2	3	5	2	5	5	5	42			6				41
Chickens	Infantis	35	6.7%	31	1	3						1	2	2	2	2	2				2				2
S   =	Heidelberg	29	5.6%	19	5	4		1		3	1	3	3	2	3	3	3	3			7	1			1
	Other	85	16.3%	61	14	9	1		4	ļ	2	21	1	1	1	l	1	5			1				9
	Total	520	100.0%	231	49	204	34	2	1	2	6	222	46	37	4:	2 4	45	57	1		54	2			222
	Kentucky	15	27.3%	5	6	3	1					9	1		1	l	1	1	1		1				3
	Typhimurium	15	27.3%	1		12	2						2	1	2	2	2	14			3				14
	Heidelberg	9	16.4%	5	2	1		1	'		2	2	1	1	1	I	1	1			3				2
<u> </u>	Enteritidis	6	10.9%	6																					
٥	I 8,20:-:z6	2	3.6%		1	1						1						1	1						1
	Ouakam	2	3.6%	2																					
	Senftenberg	2	3.6%	2																					
	Other	4	7.3%	2	1	1		_	-		_	2													1
	Total	55	100.0%	23		18		1			2	14	4	2	4		4	17	2		7				21

GEN= Gentamicin, KAN= Kanamycin, STR= Streptomycin, AMC= Amoxicillin/Clavulanic Acid, FOX= Cefoxitin, TIO= Ceftiofur, AXO= Ceftriaxone, FIS= Sulfisoxazole, COT= Trimethoprim/Sulfamethoxazole, AZI= Azithromycin, AMP= Ampicillin, CHL= Chloramphenicol, CIP= Ciprofloxacin, NAL= Nalidixic Acid, TET= Tetracycline

Table 26. Number of Non-Typhoidal Salmonella Isolates among the Top Serotypes from Turkeys with the Number of Resistant Isolates by Class and Agent, 2013

					Nur	nber o	f Isola	ites					Nun	nber o	of Resis	tant Isolates b	y Antimicrobial	Class and Ag	ent <sup>1</sup>			
							ch Iso	crobial lates are	Ami	noglyce	osides	β-Lactam/β- Lactamase Inhibitor Combinations	С	ephe	ms	Folate Pathway Inhibitors	Macrolides	Penicillins	Phenicols	Quine	olones	Tetracycline
Sources	S Salmonella Serotype	No. of Isolates	% of Isolates	0	1	2-3	4-5	6-7 8-9	GEN	KAN	STR	AMC	FOX	TIO	AXO	FIS COT	AZI	AMP	CHL	CIP	NAL	TET
	Saintpaul	20	18.9%		3	17			7		7					4		17				5
	Heidelberg	17	16.0%			12	3	2	14	6	12	5	5	5	5	5		14				2
>	Hadar	14	13.2%	1		13			1		13							2				1
Turkey	Muenchen	13	12.3%	7		6			1		2					6						7
	I 4,[5],12:i:-	6	5.7%				6				6					6		6				
Į n	Reading	5	4.7%	4		1										1						4
Ground	Albany	4	3.8%	2		1	1		1	1		1	1	2	2			2				4
ai C	Agona	3	2.8%	2		1			1		1					1		1				3
Retail	Litchfield	3	2.8%	3																		3
	Schwarzengrund	3	2.8%	2		1					1							1				3
	Other	18	17.0%	3	6	6	1	2	4	4	9	3	3	3	3	6 1		7	3			8
	Total	106	100.0%	24	9	58	11	4	29	11	51	9	9	10	10	29 1		50	3			40
	Hadar	12	13.8%	1		9	2		2		10	1	1	1	1	2		2				11
	Reading	10	11.5%	7	2	1					1					2 1		1				1
	Muenchen	8	9.2%	5		3			1		2					3						3
١	I 4,[5],12:i:-	6	6.9%			2	4		1		6					5		4			1	6
HACC	Berta	6	6.9%	5	1																	1
¥   ¥	Heidelberg	6	6.9%			5		1	3	3	3	4	4	4	4	3		4				1
=	Albany	5	5.7%	1	1	1	2		3		1	2	2	3	3	1		3				
	Typhimurium	5	5.7%	3		2			1		1					1		1				2
	Other	29	33.3%	9	6	12	2		9	3	7	1	1	1	1	9		8	1			13
	Total	87	100.0%	31	10	35	10	1	20	6	31	8	8	9	9	26 1		23	1		1	38
	Albany	5	17.9%	1	1	1	2		3		2	2	2	2	2	1		3				
	Hadar	4	14.3%			4				1	4											4
	Reading	3	10.7%	2		1					1					1						1
	Saintpaul	3	10.7%			3			1		1							3				3
	Senftenberg	3	10.7%	2		1			1	1	1							1				
<u></u>	Heidelberg	2	7.1%			2			1		1					1		1				2
Cecal	Schwarzengrund	2	7.1%	2														1				
	Typhimurium	2	7.1%			2			1	1	1					1		1				2
	Agona	1	3.6%			1			1		1											1
	Enteritidis	1	3.6%	1																		
	Indiana	1	3.6%	1																		
	Kentucky	1	3.6%	1																		
	Total	28	100.0%	10	1	15	2		8	3	12	2	2	2	2	4	<u> </u>	10				13

<sup>&</sup>lt;sup>1</sup> GEN= Gentamicin, KAN= Kanamycin, STR= Streptomycin, AMC= Amoxicillin/Clavulanic Acid, FOX= Cefoxitin, TIO= Ceftiofur, AXO= Ceftriaxone, FIS= Sulfisoxazole, COT= Trimethoprim/Sulfamethoxazole, AZI= Azithromycin, AMP= Ampicillin, CHL= Chloramphenicol, CIP= Ciprofloxacin, NAL= Nalidixic Acid, TET= Tetracycline

Table 27. Number of Non-Typhoidal Salmonella Isolates among the Top Serotypes from Cattle with the Number of Resistant Isolates by Class and Agent, 2013

					Num	ber o	f Isola	ates						Nun	nber	of Res	stant Is	olates b	y Antimicrobial	Class and Ag	ent <sup>1</sup>			
							ch Iso	crobia olates a		Amino	glyco	sides	β-Lactam/β- Lactamase Inhibitor Combinations	С	ephe	ems	Pat	olate thway ibitors	Macrolides	Penicillins	Phenicols	Quinolones		Tetracyclines
Sources	s Salmonella Serotype	No. of Isolates	% of Isolates	0	1	2-3	4-5	6-7	8-9	GEN	KAN	STR	AMC	FOX	TIC	AXO	FIS	COT	AZI	AMP	CHL	CIP	NAL	TET
	Dublin	4	25.0%					4		1	1	3	4	3	3	4	4			4	4			4
- -	Montevideo	4	25.0%	2	2																			2
å	Infantis	2	12.5%	2																				
P P	Anatum	1	6.3%	1																				
Jo 1	Heidelberg	1	6.3%			1				1							1							1
I≝	Kentucky	1	6.3%	1																				
Ret	Mbandaka	1	6.3%			1				1	1	1					1							
	Muenster	1	6.3%	1																				
_	Total	15	93.8%	7	2	2		4		3	2	4	4	3	3	4	6			4	4			7
	Montevideo	89	28.7%	79	6	2		2			2	3	2	2	2	2	2			2	2		0	10
	Typhimurium	23	7.4%	13		2	1	5	2		2	9	7	7	7	7	10			9	7		2	9
	Meleagridis	22	7.1%	16		2	4					6					6			1	4			6
	Dublin	21	6.8%	2		1	1	14	3	4	11	14	18	17	18	18	18			18	17		4	16
	Anatum	16	5.2%	14	2																			2
8	Kentucky	14	4.5%	11	3							1												2
AC	Muenchen	13	4.2%	13																				
=	Newport	13	4.2%	3				10			2	10	10	10	10	10	10	2		10	9			10
	Cerro	12	3.9%	12																				
	Infantis	7	2.2%	7																				
	Panama	7	2.2%	6	1							1												
	Other	73	23.5%	49	4	7	5	8		2	2	18	9	9	9	9	18	2		13	9		1	22
	Total	310	100.0%	225	16	14	11	39	5	6	19	62	46	45	46	46	64	4		53	48		7	77
	Montevideo	21	16.9%	17	3			1				1	1	1	1	1	1			1	1			4
2	Anatum	18	14.5%	17	1																			1
Cattle	Typhimurium	14	11.3%	4	2		5	3			2	8	3	3	3	3	8			8	4			10
	Meleagridis	9	7.3%	7			2					2					2				2			2
	Newport	8	6.5%	2				6				6	6	6	6	6	6			6	6			6
_	Cerro	6	4.8%	6																				
ee	Kentucky	6	4.8%	3	3																			3
18	Muenchen	4	3.2%	4																				
eca	Muenster	4	3.2%	3			1					1					1	1					1	1
ျပ	Uganda	4	3.2%	3				1			1	1	1	1	1	1	1	1		1	1			1
	Agona	3	2.4%	1		2											2							2
	Lille	3	2.4%	1	2																			2
	Mbandaka	3	2.4%	3																				
	Senftenberg	3	2.4%	2	1																			1
	Other	18	14.5%	15	1			1	1			2	2	2	2		2	1		2	2		1	3
$\vdash$	Total	124	100.0%	88	13	2	8	12	1		3	21	13	13	13	13	23	3		18	16		2	36
	Cerro	92	29.7%	89	3																			3
	Montevideo	56	18.1%	50	3	1		2			1	2	2	2		2	3	1		2	2			5
	Typhimurium	21	6.8%	7			3	11				14	11	11		11	14			14	13			14
2	Anatum	18	5.8%	15	2	1							1	1	1	1				1				2
Dai	Meleagridis	17	5.5%	15		1	1					2					2				1			2
) ja	Muenster	16	5.2%	15		1						1					1							1
ő	Kentucky	15	4.8%	12	3							1												2
	Muenchen	9	2.9%	8	1																			1
	Newport	7	2.3%	2				5				5	5	5	5		5			5	5			5
	Other	59	19.0%	55	1	1		1	1		1	3	2	2	2	2	2	1		3	2	1	1	3

GEN= Gentamicin, KAN= Kanamycin, STR= Streptomycin, AMC= Amoxicillin/Clavulanic Acid, FOX= Cefoxitin, TIO= Ceftiofur, AXO= Ceftriaxone, FIS= Sulfisoxazole, COT= Trimethoprim/Sulfamethoxazole, AZI= Azithromycin, AMP= Ampicillin, CHL= Chloramphenicol, CIP= Ciprofloxacin, NAL= Nalidixic Acid, TET= Tetracycline

Table 28. Number of Non-Typhoidal Salmonella Isolates among the Top Serotypes from Swine with the Number of Resistant Isolates by Class and Agent, 2013

					Nun	nber o	f Isola	ites					Num	nber o	f Resis	tant Isolates	by Antimicrobial	Class and Ag	ent <sup>1</sup>			
							ch Iso	crobial lates are	Am	noglyc	osides	β-Lactam/β- Lactamase Inhibitor Combinations	C	ephen	ns	Folate Pathway Inhibitors	Macrolides	Penicillins	Phenicols	Quino	lones	Tetracyclines
Source	s Salmonella Serotype	No. of Isolates	% of Isolates	0	1	2-3	4-5	6-7 8-9	GEN	KAN	STR	AMC	FOX	TIO	AXO	FIS COT	AZI	AMP	CHL	CIP	NAL	TET
	Derby	5	20.8%	2	1	2					2					2						3
	Typhimurium	4	16.7%	1			3				3					3		3	3			3
	Johannesburg	3	12.5%	3																		
9	Heidelberg	2	8.3%			2				2	2							1				2
2	I 4,[5],12:i:-	2	8.3%				2				2					2		2				2
1	Muenchen	2	8.3%	2																		
á	Saintpaul	2	8.3%	2																		
lich	Bredeney	1	4.2%			1					1											1
à	Infantis	1	4.2%	1																		
	Liverpool	1	4.2%	1																		
	Ohio	1	4.2%	1																		
	Total	24	100.0%	13	1	5	5			2	10					7		6	3			11
	Derby	38	14.6%	8	8	21	1			1	22					21		1				30
	Anatum	33	12.7%	21	9	2	1			1						2		1			1	12
	Johannesburg	21	8.1%	20		1						1	1	1	1			1				
7	Typhimurium	21	8.1%	4	2	5	9	1	2	3	12			1	1	15 2	1	14	6	1	1	13
20	Infantis	20	7.7%	16		3		1			3	2	2	2	2	2		2	1			3
1 2	Agona	12	4.6%	7	1	4										4						5
9 2	Uganda	11	4.2%	11																		
Swine	Cerro	10	3.8%	10																		
S S	Muenchen	9	3.5%	7		2					1					2						2
٥	Meleagridis	6	2.3%	6																		
	Senftenberg	6	2.3%	6																		
	Other	73	28.1%	57	5	6	3	1 1	1	3	9	2	2	2	2	8		6	2		1	16
	Total	260	100.0%	173	25	44	14	3 1	3	8	47	5	5	6	6	54 2	1	25	9	1	3	81
	Anatum	43	14.9%	26	17																	17
	Johannesburg	33	11.4%	30	3																	3
	Infantis	27	9.3%	24		1		1 1		2	3	2	2	2	2	2 1	1	2	2			3
	Derby	24	8.3%	9	3	12					12					12						15
	Uganda	22	7.6%	22																		
(9)	Muenchen	14	4.8%	12	1	1										1						2
, and	Meleagridis	12	4.2%	11	1																	1
5	Adelaide	11	3.8%	10	1																	1
3	Agona	11	3.8%	6	2	2		1			1	2	2	2	2	2 1		2	1			4
	Saintpaul	10	3.5%	10																		
	Cerro	8	2.8%	8																		
	Chailey	6	2.1%		6																	6
	Other	68	23.5%	47	7	8	4	1 1	2	2	11	3	3	3	3	11 1		6	4	1	2	19
	Total	289	100.0%	215	41	24	4	3 2	2	4	27	7	7	7	7	28 3	1	10	7	1	2	71

GENE Gentamicin, KAN= Kanamycin, STR= Streptomycin, AMC= Amoxicillin/Clavulanic Acid, FOX= Cefoxitin, TIO= Ceftiofur, AXO= Ceftriaxone, FIS= Sulfisoxazole, COT= Trimethoprim/Sulfamethoxazole, AZI= Azithromycin, AMP= Ampicillin, CHL= Chloramphenicol, CIP= Ciprofloxacin, NAL= Nalidixic Acid, TET= Tetracycline

## **Multidrug Resistance**

Year	1115 6	among all Non-Typ	2002	2003	2004	2002-201	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	1998	1855	1782	2036	2171	2145	2384	2193	2449	2335	2233	2178
	Chickens	Retail Chickens HACCP Cecal	60 1500	83 1158	157 1280	153 1989	152 1380	99 994	198 624	272 551	171 564	158 491	229 864	208 520 55
	Turkeys	Retail Ground Turkey HACCP Cecal	74 244	114 262	142 236	183 227	159 304	190 271	246 148	193 121	202 151	162 103	91 175	106 87 28
	Cattle	Retail Ground Beef HACCP Cecal (Beef)	9 1008	10 670	14 607	8 329	19 389	13 439	24 443	14 200	7 247	9 340	13 280	15 310 124
	Swine	Cecal (Dairy)  Retail Pork Chops  HACCP <sup>2</sup>	10 379	5 211	11 308	9 301	8 304	18 211	23 111	8 120	20 111	28 90	12	310 24
	Ó	Cecal (Market Hogs) Cecal (Sows)												260 289
Resistance Pattern		Source												
1. No Resistance Detected		Humans	79.1% 1581	78.0% 1447	79.9% 1424	80.9% 1648	80.5% 1748	81.1% 1739	83.9% 2000	83.2% 1824	84.6% 2073	84.8% 1981	84.7% 1892	80.8% 1760
	"	Retail Chickens	51.7% 31	45.8% 38	40.1% 63	46.4% 71	38.8% 59	47.5% 47	46.0% 91	29.0% 79	36.3% 62	25.9% 41	37.1% 85	40.4% 84
	Chickens	HACCP	62.0% 930	61.1% 708	62.7% 803	61.2% 1217	57.2% 790	53.9% 536	60.4% 377	56.1% 309	49.3% 278	50.7% 249	52.0% 449	44.4% 231
	ర్	Cecal	930	708	803	1217	790	536	3//	309	2/0	249	449	41.8%
		Retail Ground Turkey	37.8%	34.2%	28.9%	30.1%	17.6%	15.3%	20.7%	22.3%	30.7%	22.2%	35.2%	23 22.6%
	eys		28 29.9%	39 24.0%	41 33.5%	55 27.8%	28 28.0%	29 15.5%	51 21.6%	43 19.8%	62 25.2%	36 40.8%	32 29.1%	24 35.6%
	Turkeys	HACCP	73	63	79	63	85	42	32	24	38	42	51	31 35.7%
		Cecal												10
		Retail Ground Beef	77.8% 7	60.0% 6	78.6% 11	75.0% 6	73.7% 14	92.3% 12	79.2% 19	57.1% 8	57.1% 4	55.6% 5	69.2% 9	46.7% 7
	Cattle	HACCP	64.3% 648	61.0% 409	65.6% 398	63.2% 208	67.6% 263	72.0% 316	68.8% 305	68.5% 137	61.1% 151	67.6% 230	69.3% 194	72.6% 225
	ပိ	Cecal (Beef)												71.0% 88
		Cecal (Dairy)												86.5% 268
	_	Retail Pork Chops	20.0%	20.0%	45.5%	44.4%	25.0%	44.4%	65.2%	50.0%	35.0%	25.0%	33.3%	54.2%
		HACCP	40.1%	1 53.6%	5 37.3%	4 44.5%	2 34.5%	8 43.1%	15 47.7%	44.2%	7 44.1%	7 57.8%	4	13
	Swine		152	113	115	134	105	91	53	53	49	52		66.5%
	0,	Cecal (Market Hogs)												173
		Cecal (Sows)												74.4% 215
2. Resistant to ≥ 3		Humans	12.3% 245	14.2% 263	11.4% 204	11.9% 243	11.8% 256	11.1% 239	9.6% 228	9.6% 211	9.2% 225	9.1% 213	8.6% 193	9.8% 214
Antimicrobial Classes		Retail Chickens	20.0% 12	30.1% 25	34.4% 54	25.5% 39	24.3% 37	25.3% 25	37.4% 74	48.5% 132	41.5% 71	44.9% 71	33.2% 76	26.0% 54
	Chickens	HACCP	14.2% 213	13.5%	15.8%	15.1% 301	16.4%	17.8% 177	11.4% 71	15.6% 86	15.2%	7.9% 39	13.4%	10.4%
	ర్	Cecal	213	156	202	301	226	177	71	00	86	39	116	9.1%
		Retail Ground Turkey	20.3%	28.9%	26.1%	29.0%	24.5%	42.6%	51.6%	26.4%	33.2%	50.0%	39.6%	5 39.6%
	eys		15 24.2%	33 21.8%	37 27.1%	53 28.2%	39 27.3%	81 33.6%	127 29.7%	51 33.1%	67 37.1%	81 23.3%	36 40.0%	42 34.4%
	Turkeys	HACCP	59	57	64	64	83	91	44	40	56	24	70	30 28.6%
		Cecal					12.50							8
		Retail Ground Beef	22.2% 2	40.0% 4	14.3% 2	25.0% 2	10.5% 2	0.0%	20.8% 5	35.7% 5	42.9% 3	11.1% 1	23.1% 3	33.3% 5
	tte	HACCP	24.5% 247	29.6% 198	21.1% 128	27.7% 91	23.9% 93	22.1% 97	23.5% 104	26.0% 52	28.7% 71	20.0% 68	20.0% 56	20.3% 63
	Ca	Cecal (Beef)												16.9% 21
		Cecal (Dairy)												9.0%
	_	Retail Pork Chops	60.0%	40.0%	18.2%	22.2%	25.0%	5.6%	17.4%	50.0%	50.0%	28.6%	25.0%	28 33.3%
		HACCP	6 34.0%	23.7%	33.4%	2 31.9%	22.7%	1 28.0%	4 29.7%	4 31.7%	10 27.9%	8 15.6%	3	8
	Swine		129	50	103	96	69	59	33	38	31	14		17.7%
		Cecal (Market Hogs)												46 9.0%
		Cecal (Sows)		44.424		2.121							- 101	26
3. Resistant to ≥ 4		Humans	9.8% 195	11.4% 211	9.3% 165	9.1% 185	8.2% 177	8.2% 176	7.4% 177	7.3% 159	6.8% 166	6.5% 152	6.1% 137	7.7% 167
Antimicrobial Classes	s	Retail Chickens	3.3% 2	16.9% 14	24.2% 38	18.3% 28	15.1% 23	13.1% 13	22.7% 45	34.6% 94	32.7% 56	32.9% 52	28.4% 65	21.2% 44
	Chickens	HACCP	7.7% 115	6.8% 79	9.8% 126	8.7% 174	10.3% 142	12.3% 122	7.5% 47	11.1% 61	11.3% 64	5.1% 25	7.9% 68	6.9% 36
	ာ်	Cecal	110	,,,	120	17.1	112	122	.,	- 01		20	- 00	7.3%
		Retail Ground Turkey	13.5%	14.9%	12.7%	7.7%	8.2%	14.7%	15.4%	12.4%	17.8%	24.7%	16.5%	14.2%
	Turkeys	HACCP	10 11.1%	17 9.5%	18 10.2%	14 11.5%	13 12.2%	28 15.1%	38 10.1%	24 11.6%	36 17.9%	40 11.7%	15 12.0%	15 12.6%
	Ę	Cecal	27	25	24	26	37	41	15	14	27	12	21	11 7.1%
	$\vdash$		22.2%	40.0%	14.3%	12.5%	5.3%	0.0%	12.5%	35.7%	42.9%	11.1%	23.1%	2 26.7%
		Retail Ground Beef	2 22.1%	4 27.5%	18.8%	1 24.9%	1 22.1%	21.0%	3 21.9%	5 24.5%	3 25.5%	19.4%	3 17.5%	4 17.7%
	Cattle	HACCP	223	184	114	82	86	92	97	49	63	66	49	55 16.9%
	٦	Cecal (Beef)												21
		Cecal (Dairy)												7.7% 24
		Retail Pork Chops	40.0% 4	40.0% 2	18.2% 2	22.2% 2	25.0% 2	5.6% 1	13.0% 3	25.0% 2	5.0% 1	14.3% 4	8.3% 1	20.8% 5
	e e	HACCP	12.7%	10.9%	15.3% 47	13.3% 40	9.9%	17.5%	14.4%	15.0%	11.7%	8.9%		
	Swine	Cecal (Market Hogs)	48	23	4/	40	30	37	16	18	13	8		6.9%
		Cecal (Sows)												18 3.1%
<sup>1</sup> Starting in 2011, testing included	nino o		the additi-	n of the ma	rolido azitk	omycin Po-	use resist-	nce to azith	omycin io le	(in this so-	2 (19/1) 25/1	microbial at	es resister	9

<sup>&</sup>lt;sup>1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

<sup>2</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

Table 29b. Resistance Patte	21115	among an Non-1y	2002	2003	2004	2002-201	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	1998	1855	1782	2036	2171	2145	2384	2193	2449	2335	2233	2178
	Chickens	Retail Chickens HACCP	60 1500	83 1158	157 1280	153 1989	152 1380	99 994	198 624	272 551	171 564	158 491	229 864	208 520
		Cecal  Retail Ground Turkey	74	114	142	183	159	190	246	193	202	162	91	55 106
	Turkeys	HACCP Cecal	244	262	236	227	304	271	148	121	151	103	175	87 28
	_	Retail Ground Beef	9	10	14	8	19	13	24	14	7	9	13	15
	Cattle	HACCP Cecal (Beef) Cecal (Dairy)	1008	670	607	329	389	439	443	200	247	340	280	310 124 310
		Retail Pork Chops	10	5	11	9	8	18	23	8	20	28	12	24
	Swine	HACCP <sup>2</sup> Cecal (Market Hogs)	379	211	308	301	304	211	111	120	111	90		260
Resistance Pattern		Cecal (Sows) Source												289
4. Resistant to ≥ 5		Humans	8.2% 164	9.8% 182	8.0% 142	7.2% 146	6.3% 137	6.9% 149	6.6% 157	6.2% 137	5.2% 128	4.6% 108	3.9% 88	4.0% 87
Antimicrobial Classes		Retail Chickens	3.3%	12.0%	22.3%	17.6%	14.5%	12.1%	18.7%	31.6%	30.4%	27.8%	24.5%	19.2%
	Chickens	HACCP	5.7%	10 4.9%	35 8.0%	27 5.9%	6.6%	7.4%	37 6.1%	86 7.8%	52 9.0%	44 3.5%	56 5.9%	40 5.4%
	Chic	Cecal	85	57	103	117	91	74	38	43	51	17	51	28 5.5%
			10.8%	4.4%	4.9%	2.7%	3.1%	3.2%	3.3%	3.6%	11.4%	19.1%	7.7%	3 6.6%
	ays	Retail Ground Turkey	8 6.6%	5 3.1%	7 5.5%	5 6.2%	5 5.9%	6 7.0%	8 4.1%	7 9.1%	23 9.3%	31 6.8%	7 5.7%	7 2.2%
	Turkeys	HACCP	16	8	13	14	18	19	6	11	14	7	10	2
		Cecal												3.6% 1
		Retail Ground Beef	22.2% 2	40.0% 4	14.3% 2	12.5% 1	5.3% 1	0.0%	12.5% 3	14.3% 2	28.6% 2	11.1% 1	23.1% 3	26.7% 4
	Cattle	HACCP	19.3% 195	23.6% 158	17.8% 108	23.1% 76	20.1% 78	18.9% 83	19.0% 84	20.0% 40	23.1% 57	16.2% 55	13.6% 38	14.8% 46
	ပိ	Cecal (Beef)												12.1% 15
		Cecal (Dairy)												7.1% 22
		Retail Pork Chops	40.0% 4	40.0% 2	9.1% 1	22.2% 2	0.0%	0.0%	0.0%	25.0% 2	5.0%	10.7% 3	0.0%	12.5%
		HACCP	9.0%	9.5%	12.3%	10.3%	5.9%	11.4%	8.1%	14.2%	7.2%	4.4%	0	3
	Swine	Cecal (Market Hogs)	34	20	38	31	18	24	9	17	8	4		4.2%
		Cecal (Sows)												2.1%
		Humans	7.8%	9.3%	7.2%	6.9%	5.6%	6.3%	5.8%	5.1%	4.4%	3.9%	3.4%	6 3.4%
5. At Least ACSSuT <sup>3</sup> Resistant			156 0.0%	173 2.4%	129 1.9%	141 0.7%	121 2.6%	136 0.0%	138 0.5%	112 0.0%	107 1.2%	91 0.0%	77 0.0%	74 0.5%
	sens	Retail Chickens	0 1.9%	2 1.5%	3 0.9%	1.6%	1.6%	0 1.5%	1.4%	0 1.3%	2.3%	0.4%	0.3%	1 0.2%
	Chickens	HACCP	29	17	12	31	22	15	9	7	13	2	3	1 0.0%
		Cecal	4.40/	0.00/	2.00/	0.5%	0.6%	1.6%	4.69/	0.59/	2.50/	2.49/	2.20/	0
	ıys	Retail Ground Turkey	1.4%	0.9%	2.8%	1	1	3	1.6%	0.5%	2.5%	3.1% 5	3.3%	2.8%
	Turkeys	HACCP	4.5% 11	2.3% 6	4.7% 11	4.0% 9	3.9% 12	4.8% 13	2.0%	3.3% 4	4.0% 6	1.0% 1	1.1% 2	1.1%
		Cecal	00.00/	40.00/	11.00/	10.50/	5.00/	0.00/	10.50/	44.00/	00.00/	0.00/	00.40/	0.0%
		Retail Ground Beef	22.2%	40.0%	14.3%	12.5%	5.3%	0.0%	12.5%	14.3%	28.6%	0.0%	23.1%	20.0%
	Cattle	HACCP	17.1% 172	18.1% 121	16.3% 99	20.4% 67	18.3% 71	16.2% 71	18.1% 80	15.0% 30	18.6% 46	12.6% 43	9.3% 26	12.9% 40
	0	Cecal (Beef)												11.3% 14
		Cecal (Dairy)												7.1% 22
		Retail Pork Chops	40.0% 4	40.0% 2	9.1% 1	22.2% 2	0.0% 0	0.0% 0	0.0%	12.5% 1	5.0% 1	10.7% 3	0.0%	12.5% 3
	Swine	HACCP	7.7% 29	7.6% 16	12.0% 37	9.6% 29	5.3% 16	10.9% 23	8.1% 9	13.3% 16	7.2% 8	4.4% 4		
	Š	Cecal (Market Hogs)												3.5% 9
		Cecal (Sows)												2.1% 6
6. At Least ACT/S <sup>4</sup> Resistant		Humans	1.1% 21	1.2% 23	0.6% 10	0.9% 18	0.7% 15	0.7% 16	0.5% 11	0.7% 15	0.4% 11	0.4% 9	0.3% 7	0.5% 10
	ñ	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
	Ö	Cecal												0.0%
		Retail Ground Turkey	1.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5% 4	0.0%	0.9%
	Turkeys	HACCP	0.8%	0.0%	0.4%	0.0%	0.3%	0.0%	0.7%	0.8%	0.0%	0.0%	0.0%	0.0%
	ř	Cecal												0.0%
		Retail Ground Beef	0.0%	0.0%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	횾	HACCP	2.4%	2.7% 18	1.2%	4.3%	4.1% 16	2.5%	3.8%	1.5%	4.5% 11	1.5%	0.4%	1.0%
	Cattle	Cecal (Beef)	24	10	,	14	10	11	17	3		3		1.6%
		Cecal (Dairy)												0.3%
		Retail Pork Chops	20.0%	0.0%	0.0%	11.1%	0.0%	0.0%	0.0%	12.5%	0.0%	0.0%	0.0%	0.0%
	g.	HACCP	0.5%	0.9%	0.6%	1.7%	0.3%	1.9%	0.9%	1.7%	0.0%	0.0%	0	0
	Swine	Cecal (Market Hogs)	2	2	2	5	1	4	1	2	U	0		0.0%
		Cecal (Sows)												0.7%
1 Starting in 2011, testing included i	<u>.</u>					L. D.				(i= 4b:=	40()4			2

<sup>2
1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

2 In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

3 ACSSuT = ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline

4 ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole

Table 29c.	Resistance	<b>Patterns</b>	among	all No	n-Typhoida	l Salmonella	Isolates.	2002-2013

Table 29c. Resistance Patt	terns a	among all Non-Typ	ohoidal S	almonella 2003	Isolates,	2002-2013	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	1998	1855	1782	2005	2171	2145	2384	2193	2449	2335	2012	2178
	sus	Retail Chickens	60	83	157	153	152	99	198	272	171	158	229	208
	Chickens	HACCP	1500	1158	1280	1989	1380	994	624	551	564	491	864	520
		Cecal  Retail Ground Turkey	74	114	142	183	159	190	246	193	202	162	91	55 106
	Turkeys	HACCP	74 244	114 262	142 236	183 227	159 304	190 271	246 148	193 121	202 151	162	91 175	106 87
	1	Cecal												28
		Retail Ground Beef	9	10	14	8	19	13	24	14	7	9	13	15
	Cattle	HACCP Cecal (Beef)	1008	670	607	329	389	439	443	200	247	340	280	310 124
		Cecal (Dairy)												310
		Retail Pork Chops	10	5	11	9	8	18	23	8	20	28	12	24
	Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	379	211	308	301	304	211	111	120	111	90		260
		Cecal (Sows)												289
Resistance Pattern	_	Source	3.4%	3.2%	2.4%	2.0%	2.0%	2.1%	1.8%	1.4%	1.3%	1.5%	1.5%	1.4%
7. At Least ACSSuTAuCx <sup>2</sup>		Humans	67	60	42	41	43	46	44	30	33	36	34	31
Resistant	S.	Retail Chickens	0.0%	0.0%	1.9%	0.0%	2.6% 4	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.9% 13	1.0% 12	0.4% 5	0.9% 18	1.1% 15	1.4% 14	1.1% 7	1.3% 7	2.0% 11	0.4% 2	0.2%	0.2%
	ర్	Cecal	13	12	3	10	13	14	,	,	- ''			0.0%
		Retail Ground Turkey	1.4%	0.9%	2.1%	0.5%	0.0%	1.1%	1.2%	0.5%	2.0%	3.1%	3.3%	1.9%
	Turkeys	HACCP	1.6% 4	0.8%	2.1% 5	1.8%	0 2.3% 7	4.1% 11	3 2.0% 3	3.3% 4	1.3%	5 1.0% 1	0.0% 0	0.0% 0
	2	Cecal	4		5	4		11	3	4	2	1	U	0.0%
	┢	Retail Ground Beef	22.2%	40.0%	14.3%	0.0%	0.0%	0.0%	8.3%	14.3%	28.6%	0.0%	15.4%	20.0%
		HACCP	14.6%	4 15.1%	12.0%	0 17.3%	0 16.2%	13.9%	2 14.7%	9.5%	2 16.2%	11.2%	6.8%	3 12.6%
	Cattle	Cecal (Beef)	147	101	73	57	63	61	65	19	40	38	19	39 9.7%
		Cecal (Dairy)												12 6.5%
	-	Retail Pork Chops	20.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.6%	0.0%	20 0.0%
		HACCP	1.8%	1.9%	1.0%	2.7%	0.7%	0.5%	0.9%	1.7%	0.9%	2.2%	0	0
	Swine		7	4	3	8	2	1	1	2	1	2		1.2%
	0,	Cecal (Market Hogs)												3 1.7%
		Cecal (Sows)												5
8. At Least Ceftriaxone and		Humans	0.2% 4	0.1% 1	0.1% 2	0.0%	0.2% 4	0.2% 5	0.0%	0.2% 4	0.1% 2	0.1% 2	0.3% 6	0.2% 5
Nalidixic Acid Resistant	s	Retail Chickens	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.5%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	ర్	Cecal												0.0%
		Retail Ground Turkey	0.0%	0.9%	0.0%	0.0%	0.0%	0.5%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%
	Turkeys	HACCP	1.2%	0.4%	0.8%	0.9%	0.3%	0.7%	0.0%	0.0%	0.7%	0.0%	0.0%	0.0%
	μĒ	Cecal	3	1	2	2	1	2	0	0	1	0	0	0.0%
	H	Retail Ground Beef	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.3%	0.0%	0.0%	0.0%	0.0%
	Ф	HACCP	0.2%	0.4%	1.0%	0.9%	0.3%	0.2%	0.7%	0.0%	1.2%	0.9%	1.8%	1.9%
	Cattle	Cecal (Beef)	2	3	6	3	1	1	3	0	3	3	5	0.8%
		Cecal (Dairy)												0.3%
		Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	9	HACCP	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0
	Swine	Cecal (Market Hogs)	1	0	0	0	0	0	0	0	0	0		0.4%
		Cecal (Sows)												0.3%
		Odcai (OUWS)												1

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low <sup>2</sup> ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

Table 30. Non-Typhoidal Salmonella Isolates that are Resistant to ≥ 3 Antimicrobial Classes, by Serotype, 2012

	Humans						Chicke	ns			
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Humans	Typhimurium	73	37.8	Retail	Typhimurium	57	75.0	HACCP	Kentucky	61	52.6
(N=193)	I 4,[5],12:i:-	33	17.1	Chickens	Kentucky	15	19.7	(N=116)	Typhimurium	39	33.6
` '	Newport	16	8.3	(N=76)	I 4,[5],12:i:-	2	2.6		Heidelberg	9	7.8
	Heidelberg	11	5.7		Anatum	1	1.3		I 4,[5],12:i:-	2	1.7
	Enteritidis	10	5.2		Mbandaka	1	1.3		4:i:-	1	0.9
	Dublin	7	3.6		IVIDALIUANA	'	1.5		18,20:-:z6	1	0.9
	Agona	5	2.6						Enteritidis	1	0.9
	Derby	4	2.0						Litchfield	1	0.9
	,										
	Infantis	4	2.1						Rough O:i:1,2	1	0.9
	Saintpaul	3	1.6				Turkey	·C			
	Anatum	2	1.0	C	0				Caratina	_	0/
	Hadar	2	1.0	Source	Serotype	n	%	Source	Serotype	n	%
	Kentucky	2	1.0								
	Reading	2	1.0	Retail	Heidelberg	5	13.9	HACCP (N=70)	Heidelberg	11	15.7
	Schwarzengrund	2	1.0	Ground Turkey	Saintpaul	5	13.9	(14-70)	Hadar	11	15.7
	Stanley	2	1.0	(N=36)	Typhimurium	4	11.1		Albany	9	12.9
	I 4,[5],12:-:1,2	1	0.5		Agona	3	8.3		Saintpaul	9	12.9
	I 6,7:r:-	1	0.5		Infantis	3	8.3		Agona	5	7.1
	Albert	1	0.5		Albany	2	5.6		Berta	3	4.3
	Berta	1	0.5		Anatum	2	5.6		Montevideo	3	4.3
	Blockley	1	0.5		Hadar	2	5.6		Typhimurium	3	4.3
	Braenderup	1	0.5		Schwarzengrund	2	5.6		Johannesburg	2	2.9
	Brandenburg	1	0.5		Berta	1	2.8		Senftenberg	2	2.9
	Choleraesuis	1	0.5		Brandenburg	1	2.8		4:i:-	1	1.4
	Javiana	1	0.5		Javiana	1	2.8		I 4,[5],12:i:-	1	1.4
	Johannesburg	1	0.5		Montevideo	1	2.8		Altona	1	1.4
	Ohio	1	0.5		Muenchen	1	2.8		Anatum	1	1.4
	Uganda	1	0.5		Newport	1	2.8		Bredeney	1	1.4
	Unknown serotype	1	0.5		Reading	1	2.8		Kentucky	1	1.4
	Partially serotyped	2	1.0		Worthington	1	2.8		Muenchen	1	1.4
	r artially serotypeu	2	1.0		worthington	'	2.0			1	1.4
									Newport Reading	1	1.4
									•		
									Schwarzengrund	1	1.4
									Tennessee	1	1.4
									Uganda	1	1.4
							Cattle				
				Source	Serotype	n	Cattle	Source	Serotype	n	%
				Source	Зеготуре		70	Source	Зеготуре		70
				Retail	Dublin	3	100.0	HACCP (N=56)	Dublin	28	50.0
				Ground Beef				(N=30)	Typhimurium	10	17.9
				(N=3)					Newport	4	7.1
									I 4,[5],12:i:-	2	3.6
									Montevideo	2	3.6
									Reading	2	3.6
									4:i:-	1	1.8
									Heidelberg	1	1.8
									Infantis	1	1.8
									Kentucky	1	1.8
									Muenchen	1	1.8
									Muenster	1	1.8
									Poona	1	1.8
									Rough O:i:1,2	1	1.8
										•	
				Course	Sanata was		Swine		O		61
				Source	Serotype	n	%	Source	Serotype	n	%
				Retail	Derby	1	33.3	HACCP <sup>1</sup>			
				Retail Pork Chops	Heidelberg	1	33.3	(N=0)			
				(N=3)	-		33.3	l` "			
				[` -'	Typhimurium	1	33.3				
				1				1			

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 31. Non-Typhoidal Salmonella Isolates that are Resistant to ≥ 4 Antimicrobial Classes, by Serotype, 2012

Humans Serotype  Typhimurium 14,[5],12:i:- Newport Dublin Enteritidis Agona Derby Infantis Kentucky Saintpaul 14,[5],12:-1,2 Albert Blookley Braenderup Choleraesuis	62 31 10 7 6 3 2 2 2 2 1 1	% 45.3 22.6 7.3 5.1 4.4 2.2 1.5 1.5 1.5 0.7 0.7	Retail Chickens (N=65)	Serotype  Typhimurium Kentucky 14,[5],12:i-  Serotype  Typhimurium	n 49 14 2	75.4 21.5 3.1 Turkey	HACCP (N=68)	Serotype  Kentucky Typhimurium Heidelberg 4::- 18,20:-:z6  Serotype	31 30 5 1	% 45.6 44.1 7.4 1.5 1.5
14,[5],12:i- Newport Dublin Enteritidis Agona Derby Infantis Kentucky Saintpaul 14,[5],12::1,2 Albert Blockley Braenderup Choleraesuis	31 10 7 6 3 2 2 2 2 1 1	22.6 7.3 5.1 4.4 2.2 1.5 1.5 1.5 0.7	Chickens (N=65)  Source	Kentucky 14.[5],12:i- Serotype	14 2	21.5 3.1 <b>Turkey</b>	(N=68)	Typhimurium Heidelberg 4:i:- 18,20:-:z6	30 5 1 1	44.1 7.4 1.5 1.5
14,[5],12:i- Newport Dublin Enteritidis Agona Derby Infantis Kentucky Saintpaul 14,[5],12::1,2 Albert Blockley Braenderup Choleraesuis	31 10 7 6 3 2 2 2 2 1 1	22.6 7.3 5.1 4.4 2.2 1.5 1.5 1.5 0.7	Chickens (N=65)  Source	Kentucky 14.[5],12:i- Serotype	14 2	21.5 3.1 <b>Turkey</b>	(N=68)	Typhimurium Heidelberg 4:i:- 18,20:-:z6	30 5 1 1	44.1 7.4 1.5 1.5
Newport Dublin Enteritidis Agona Derby Infantis Kentucky Saintpaul 14,[5],12::1,2 Albert Blockley Choleraesuis	10 7 6 3 2 2 2 2 2 1 1	7.3 5.1 4.4 2.2 1.5 1.5 1.5	(N=65)  Source  Retail	1 4,[5],12:i:-	2	3.1 Turkey	es .	Heidelberg 4:i:- 18,20:-:z6	5 1 1	7.4 1.5 1.5
Dublin Enteritidis Agona Derby Inflantis Kentucky Saintpaul 14.[5].12::1,2 Albert Blookley Braenderup Choleraesuis	7 6 3 2 2 2 2 2 1 1	5.1 4.4 2.2 1.5 1.5 1.5 1.5	Source Retail	Serotype		Turkey		4:i:- 18,20:-:z6	1 1	1.5 1.5
Entertidis Agona Derby Infantis Kentucky Saintpaul 14,[5],12:-1,2 Albert Blockley Braenderup Choleraesuis	6 3 2 2 2 2 2 1 1	4.4 2.2 1.5 1.5 1.5 1.5	Retail					18,20:-:z6	1	1.5
Agona Derby Infantis Kentucky Sainitpaul 14.[5],12:-:1,2 Albert Blockley Braenderup Choleraesuis	3 2 2 2 2 1 1	2.2 1.5 1.5 1.5 1.5 0.7	Retail							
Derby Infantis Kentucky Saintpaul 14,[5],12:-:1,2 Albert Blockley Braenderup Choleraesuis	2 2 2 2 1 1	1.5 1.5 1.5 1.5	Retail					Serotype	n	%
Infantis Kentucky Saintpaul 14,[5],12:-:1,2 Albert Blockley Braenderup Choleraesuis	2 2 2 1 1	1.5 1.5 1.5 0.7	Retail					Serotype	n	%
Kentucky Saintpaul 14,[5],12:-:1,2 Albert Blockley Braenderup Choleraesuis	2 2 1 1	1.5 1.5 0.7	Retail		n	%	Source	Serotype	n	%
Saintpaul I 4,[5],12:-:1,2 Albert Blockley Braenderup Choleraesuis	2 1 1 1	1.5 0.7		Typhimurium						
I 4,[5],12:-:1,2 Albert Blockley Braenderup Choleraesuis	1 1 1	0.7		Typhimurium						
Albert Blockley Braenderup Choleraesuis	1 1				4	26.7	HACCP	Saintpaul	4	19.0
Blockley Braenderup Choleraesuis	1	0.7	Ground Turkey	Infantis	3	20.0	(N=21)	Heidelberg	3	14.3
Braenderup Choleraesuis			(N=15)	Hadar	2	13.3		Typhimurium	3	14.3
Choleraesuis	- 1	0.7		Schwarzengrund	2	13.3		Senftenberg	2	9.5
	1	0.7		Agona	1	6.7		4:i:-	1	4.8
	1	0.7		Berta	1	6.7		I 4,[5],12:i:-	1	4.8
Heidelbera	1			Heidelberg	1	6.7			1	4.8
Reading	1			-	1				1	4.8
-	1								1	4.8
									1	4.8
,,								,		4.8
										4.8
										4.8
								Oganda		4.0
						Cattle				
			Source	Serotype	n	%	Source	Serotype	n	%
			Retail	Dublin	3	100.0		Dublin	27	55.1
			Ground Beef					Typhimurium	7	14.3
			(N=3)				(N=49)	Newport	4	8.2
								I 4,[5],12:i:-	2	4.1
									2	4.1
									2	4.1
								-	1	2.0
									1	2.0
								-	1	2.0
									•	2.0
									1	2.0
						Swine				
			Source	Serotype	n	%	Source	Serotype	n	%
			Retail Pork Chops (N=1)	Typhimurium	1	100.0	HACCP <sup>1</sup> (N=0)			
ŀ	Heidelberg Reading Jnknown serotype Partially serotyped	Reading 1 Unknown serotype 1	Reading 1 0.7 Unknown serotype 1 0.7	Reading 1 0.7  Jinknown serotype 1 0.7  Partially serotyped 2 1.5  Source  Retail Ground Beef (N=3)  Source  Retail Pork Chops	Reading 1 0.7  Jinknown serotype 1 0.7  Partially serotyped 2 1.5  Source Serotype  Retail Ground Beef (N=3)  Source Serotype  Retail Typhimurium  Pork Chops	Reading 1 0.7  Jinknown serotype 1 0.7  Partially serotyped 2 1.5  Source Serotype n  Retail Ground Beef (N=3)  Source Serotype n  Retail Typhimurium 1  Pork Chops	Newport	Newport   1   6.7	Heidelberg	Heidelberg

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 32. Non-Typhoidal Salmonella Isolates that are Resistant to ≥ 5 Antimicrobial Classes, by Serotype, 2012

	Humans						Chicke	ns			
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Humans	Typhimurium	55	62.5	Retail	Typhimurium	49	87.5	HACCP	Typhimurium	28	54.9
(N=88)	Newport	10	11.4	Chickens	Kentucky	5	8.9	(N=51)	Kentucky	16	31.4
	Dublin	7	8.0	(N=56)	I 4,[5],12:i:-	2	3.6		Heidelberg	5	9.8
	Agona	2	2.3						4:i:-	1	2.0
	Enteritidis	2	2.3						I 8,20:-:z6	1	2.0
	Infantis	2	2.3								
	Kentucky	2	2.3				Turkey	/S			
	I 4,[5],12:i:-	1	1.1	Source	Serotype	n	%	Source	Serotype	n	%
	Albert	1	1.1								
	Blockley	1	1.1	Retail	Infantis	3	42.9	HACCP	Typhimurium	3	30.0
	Choleraesuis	1	1.1	Ground Turkey	Typhimurium	2	28.6	(N=10)	Heidelberg	2	20.0
	Derby	1	1.1	(N=7)	Agona	1	14.3		Agona	1	10.0
	Reading	1	1.1		Newport	1	14.3		Bredeney	1	10.0
	Saintpaul	1	1.1						Newport	1	10.0
	Partially serotyped	1	1.1						Senftenberg	1	10.0
									Uganda	1	10.0
							Cattle	)			
				Source	Serotype	n	%	Source	Serotype	n	%
				Retail	Dublin	3	100.0	HACCP	Dublin	25	65.8
				Ground Beef				(N=38)	Typhimurium	6	15.8
				(N=3)					Montevideo	2	5.3
									Newport	2	5.3
									Reading	2	5.3
									I 4,[5],12:i:-	1	2.6
								<u> </u>			
				_			Swine				
				Source	Serotype	n	%	Source	Serotype	n	%
				Retail				HACCP <sup>1</sup> (N=0)			
				Pork Chops (N=0)				(IV=U)			
				(11-0)							

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 33. Non-Typhoidal Salmonella Isolates that are at least ACSSuT<sup>1</sup> Resistant, by Serotype, 2012

	Humans						Chicke	ns			
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Humans (N=77)	Typhimurium Newport Dublin Agona	51 10 7 2	66.2 13.0 9.1 2.6	Retail Chickens (N=0)				HACCP (N=3)	Heidelberg	3	100.0
	Albert	1	1.3				Turkey	/S			
	Blockley	1	1.3	Source	Serotype	n	%	Source	Serotype	n	%
	Choleraesuis Derby Kentucky Reading Partially serotyped	1 1 1 1	1.3 1.3 1.3 1.3	Retail Ground Turkey (N=3)	Infantis	3	100.0	HACCP (N=2)	Newport Typhimurium	1	50.0 50.0
	raitially serotypeu	1	1.3				Cattle				
				Source	Serotype	n		Source	Serotype	n	%
				Retail Ground Beef (N=3)	Dublin	3	100.0	HACCP (N=26)	Dublin Typhimurium Montevideo Reading I 4,[5],12:i:- Newport	14 6 2 2 1 1	53.8 23.1 7.7 7.7 3.8 3.8
				_			Swin				
				Source	Serotype	n	%	Source	Serotype	n	%
				Retail Pork Chops (N=0)				HACCP <sup>2</sup> (N=0)			

<sup>&</sup>lt;sup>1</sup> ACSSuT = ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline

	Humans					Chi	ckens			
Source	Serotype	n	%	Source	Serotype	n '	% Source	Serotype	n	%
Humans	Typhimurium	2	28.6				HACCP			
(N=7)	Blockley	1	14.3	Retail Chickens			(N=0)			
()	Braenderup	1	14.3	(N=0)			, <i>'</i>			
	Dublin	1	14.3	, ,						
	Newport	1	14.3			Tur	keys			
	Reading	1	14.3	Source	Serotype		% Source	Serotype	n	%
	reduing		14.5	Odurce	остотурс		70 Cource	остотурс		70
				Retail			НАССР			
				Ground Turkey			(N=0)			
				(N=0)						
				, ,						
						Ca	attle			
				Source	Serotype	n	% Source	Serotype	n	%
							НАССР			
				Retail			(N=1)	Typhimurium	1	100.0
				Ground Beef (N=0)			(14-1)			
				(14=0)						
						Sv	vine			
				Source	Serotype	n	% Source	Serotype	n	%
				Retail			HACCP <sup>2</sup>			
				Pork Chops			(N=0)			
				(N=0)						

<sup>&</sup>lt;sup>2</sup> In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

<sup>&</sup>lt;sup>1</sup> ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole
<sup>2</sup> In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 35. Non-Typhoidal Salmonella Isolates that are at least ACSSuTAuCx<sup>1</sup> Resistant, by Serotype, 2012

	Humans					ALLOX REGISTE	Chicke		,		
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Humans (N=34)	Typhimurium Newport Dublin Agona	12 10 6 2	35.3 29.4 17.7 5.9	Retail Chickens (N=0)				HACCP (N=2)	Heidelberg	2	100.0
	Albert	1	2.9				Turkey	'S			
	Blockley	1	2.9	Source	Serotype	n	%	Source	Serotype	n	%
	Choleraesuis Derby	1	2.9 2.9	Retail Ground Turkey (N=3)	Infantis	3	100.0	HACCP (N=0)			
							Cattle	•			
				Source	Serotype	n	%	Source	Serotype	n	%
				Retail Ground Beef (N=2)	Dublin	2	100.0	HACCP (N=19)	Dublin Montevideo Reading Typhimurium	12 2 2 2	63.2 10.5 10.5 10.5
							Swine				
				Source	Serotype	n	%	Source	Serotype	n	%
				Retail Pork Chops (N=0)				HACCP <sup>2</sup> (N=0)			

<sup>&</sup>lt;sup>1</sup> ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

Table 36 Non-Tynhoidal Salmonella Isolates that are at least Ceftriayone and Nalidixic Acid Resistant, by Serotyne, 201

Table 30	. Non-Typhoidal	Salmone	iia Iso	lates that are a	at least Ceftriaxo	ne and Nalid	lixic Ac	id Resist	ant, by Seroty	rpe, 2012		
	Humans						Chicke	ns				
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype		n	%
Humans (N=6)	Typhimurium Albert	2	33.3 16.7	Retail Chickens				HACCP (N=0)				
	Choleraesuis	1	16.7	(N=0)								
	Dublin	1	16.7									
	Infantis	1	16.7				Turke	ys				
				Source	Serotype	n	%	Source	Serotype		n	%
				Retail Ground Turkey (N=0)				HACCP (N=0)				
							Cattle	е				
				Source	Serotype	n	%	Source	Serotype		n	%
				Retail Ground Beef (N=0)				HACCP (N=5)	Dublin		5	100.0
							Swin					
				Source	Serotype	n	%	Source	Serotype		n	%
				Retail Pork Chops (N=0)				HACCP <sup>1</sup> (N=0)				

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

<sup>&</sup>lt;sup>2</sup> In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 37, Non-Typhoidal Salmonella Isolates that are Resistant to ≥ 3 Antimicrobial Classes, by Serotype, 2013

Mary		'. Non-Typhoidal Salmor	neiia i	00.0.0	S that are Nesi	Start to = 0 Fanti			ses, by							
Margin   4 3    2-1	_	Humans			_				I _	Chickens			-			
Marting   Mart	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Marting   Mart																
Monte   1																
Decision   1	(N=214)								(14=54)				(14-5)			
Description   1					, ,	Heidelberg	4	7.4						Kentucky	1	20.0
Entendide																
Secretariable																
Secretary   Secr																
Agricular										Havana	1	1.9				
Controlled   2										Toulous						
Cition   C					_	_			-				_	_		
During   2					Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n_	%
Description Now L(-) with miles   2								05.7	нассв	1.4593.403		00.0	Casal			05.0
Bambel Our Liry Juntones						•										
Beach   1									(	-			()			
Dente					()											
Bronzentery														-		
Procedure   1														-		
Material   1   0.5		-								-				Saintpaul	1	12.5
Lombin																
Lorentines 1 0.5   Branche Lung 1 2.4   Che						-				-						
Mondroden						-										
Marcelen   1						-							1			
Marcheropy																
Sometime employee   1   0.5     Source   Serveyse   n   N   Source   Serveyse   n						I yphimurium	1	2.4								
Delinition of the property o										Typhimurium	1	3.3				
Partially eccoped   2																
Reasily Normanical isolates													1			
Retail   Dublin   All Solutions   MacCP   Dublin   19   322   Oreal   Typhimurium   8   38.1					Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Caround Beef (Na-Cy)		Rough/Nonmotile isolates	1	0.5												
Name																
Nyprimurium						Heidelberg	1	20.0	(N=03)							
Reading   6   9.5   Heidelberg   1   48					(0)								(11-21)			
I   I   I   I   I   I   I   I   I   I										Meleagridis	6	9.5		Dublin	1	4.8
Montevideo										Reading	6	9.5		Heidelberg	1	4.8
Abarry   1   1.6   Berts   1.6   Berts   1   1.6   Berts   1.6   Berts   1   1.6										I 4,[5],12:i:-	5	7.9		Montevideo	1	4.8
Berta										Montevideo	2	3.2		Muenster	1	4.8
Heddsberg   1 1.6   Johannesburg   1 1.6   Klambu   1 1.6   (Cacal Typhimurium   14 50.0   1.6   (M=28)   Mesagndis   2 7.1   Montevideo   2 7.1   Montevi										Albany	1	1.6		Uganda	1	4.8
Source   Serotype   N   Newport   1   1.6   Cocal   Typhirunum   14   50.0										Berta	1	1.6				
Mainthail   Main										Heidelberg	1	1.6				
New Content of Conte										Johannesburg	1	1.6		Typhimurium	14	50.0
Chicago   Chic										Kiambu	1	1.6		Newport	5	17.9
Montevideo   2   7.1											1	1.6	(N=28)	Meleagridis		7.1
I 4,[5],12:- 1 3.6 Aratum														-	2	7.1
Source   Serotype   N   Sour																
Source   Serotype   N   Serotype   N   Source   Serotype   N   Serotype   N																
Source   Serotype   n   %																
Source   Serotype   N   %   %   Source   Serotype   N   %   %   Source   Serotype   N   %   %   %   Source   Serotype   N   %   %   %   Source   Serotype   N																
Source   Serotype   n   %   Serotype   n   Serotype   n   %   Serotype   n   Serotype   n																
Retail   Typhimurium   3   37.5   Pork Chops   1.4,[5],12::-   2   25.0   Derby   2   25.0   Heidelberg   1   12.5   Pirameter   1.4,[5],12::-   3   6.5   Retail   1.4,[5],12::-   3   7   Retail   1																
Retail   Typhimurium   3   37.5   Pork Chops   1.4,[5],12::-   2   25.0   Derby   2   25.0   Heidelberg   1   12.5   Pirameter   1.4,[5],12::-   3   6.5   Retail   1.4,[5],12::-   3   7   Retail   1										Swine						
Retail   Typhimurium   3   37.5   Pork Chops   14,[5],12:i-   2   25.0     (N=6)   Derby   De					Source	Serotype	n	%	Source		n	%	Source	Serotype	n	%
Pork Chops																
Pork Chops (N=8)						Typhimurium	3	37.5	HACCP <sup>1</sup>				Cecal	Derby		45.7
N=6  Derby 2 25.0   Heidelberg 1 12.5   Heidelberg 1 12.2   Brandenburg 1 2.2   Johannesburg 1 2.2   Johannesburg 1 2.2   Worthington 1 2.2   Worthington 1 2.2   Worthington 1 2.2   Worthington 1 12.5   Worthington 1 12.5   Heidelberg 1 14,[5],[2::- 2 7.7   Agona 2 7.7   Heidelberg 2 7.7   Heidelberg 2 7.7   Brandenburg 1 3.8   Senftenberg 1 3.8   Senftenberg 1 3.8   Reading 1 3.8					Bork Chons										21	
Heidelberg   1   12.5						I 4,[5],12:i:-		25.0	(N=0)				(Market Hogs)			
Anatum   1   2.2     Brandenburg   1   2.2     Give   1   2.2     Johannesburg   1   2.2     Muenchen   1   2.2     Newport   1   2.2     Worthington   1   2.2     Worthington   1   2.2     Worthington   1   2.2     Vorthington   1   2.1     (Sows)   Typhimurium   3   11.5     (N=26)   14.[5],12:i-   2   7.7     Agona   2   7.7     Heidelberg   2   7.7     Infantis   2   7.7     Brandenburg   1   3.8     Senftenberg   1   3.8     Reading   1   3.8	I						2		(N=0)				(Market Hogs) (N=46)	Typhimurium	12	26.1
Brandenburg   1   2.2     Give						Derby	2	25.0	(N=0)				(Market Hogs) (N=46)	Typhimurium I 4,[5],12:i:-	12 3	26.1 6.5
Give						Derby	2	25.0	(N=0)				(Market Hogs) (N=46)	Typhimurium I 4,[5],12:i:- Infantis	12 3 3	26.1 6.5 6.5
Johannesburg 1 2.2   Muenchen 1 2.2   Newport 1 2.2   Newport 1 2.2   Worthington 1						Derby	2	25.0	(N=0)				(Market Hogs) (N=46)	Typhimurium I 4,[5],12:i:- Infantis Anatum	12 3 3 1	26.1 6.5 6.5 2.2
Muenchen   1   2.2     Newport   1   2.2     Worthington   1   2.2     Worthington   1   2.2     Worthington   1   2.2     Cecal						Derby	2	25.0	(N=0)				(Market Hogs) (N=46)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg	12 3 3 1 1	26.1 6.5 6.5 2.2 2.2
Newport   1   2.2						Derby	2	25.0	(N=0)				(Market Hogs) (N=46)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give	12 3 3 1 1	26.1 6.5 6.5 2.2 2.2 2.2
Cecal (Sows) (N=26)       Derby (Sows) (N=26)       12 (N=26)       46.2 (N=26)       4.[5], 12::-       2 (N=26)       7.7 (N=26)						Derby	2	25.0	(N=0)				(Market Hogs) (N=46)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg	12 3 3 1 1 1	26.1 6.5 6.5 2.2 2.2 2.2 2.2
Cecal Derby 12 46.2 (Sows) Typhimurium 3 11.5 (N=26) 14,[5],12:i- 2 7.7 Agona 2 7.7 Heidelberg 2 7.7 Infantis 2 7.7 Brandenburg 1 3.8 Senftenberg 1 3.8 Reading 1 3.8						Derby	2	25.0	(N=0)				(Market Hogs) (N=46)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg Muenchen	12 3 3 1 1 1 1	26.1 6.5 6.5 2.2 2.2 2.2 2.2 2.2
(Sows) Typhimurium 3 11.5 (N=26) Typhimurium 3 11.5 14.[5],12::- 2 7.7 Agona 2 7.7 Heidelberg 2 7.7 Infantis 2 7.7 Brandenburg 1 3.8 Senftenberg 1 3.8 Reading 1 3.8						Derby	2	25.0	(N=0)				(Market Hogs) (N=46)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg Muenchen Newport	12 3 3 1 1 1 1 1	26.1 6.5 6.5 2.2 2.2 2.2 2.2 2.2 2.2
(Sows) Typhimurium 3 11.5 (N=26) Typhimurium 3 11.5 14.[5],12::- 2 7.7 Agona 2 7.7 Heidelberg 2 7.7 Infantis 2 7.7 Brandenburg 1 3.8 Senftenberg 1 3.8 Reading 1 3.8						Derby	2	25.0	(N=0)				(Market Hogs) (N=46)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg Muenchen Newport	12 3 3 1 1 1 1 1	26.1 6.5 6.5 2.2 2.2 2.2 2.2 2.2 2.2
(Sows) Typhimurium 3 11.5 (N=26) Typhimurium 3 11.5 14.[5],12::- 2 7.7 Agona 2 7.7 Heidelberg 2 7.7 Infantis 2 7.7 Brandenburg 1 3.8 Senftenberg 1 3.8 Reading 1 3.8						Derby	2	25.0	(N=0)				(Market Hogs) (N=46)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg Muenchen Newport	12 3 3 1 1 1 1 1	26.1 6.5 6.5 2.2 2.2 2.2 2.2 2.2 2.2
N=26    Splintint   S   N-3   N-3						Derby	2	25.0	(N=0)				(N=46)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg Muenchen Newport Worthington	12 3 3 1 1 1 1 1 1 1	26.1 6.5 6.5 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2
14,[5,12::- 2 7.7 Agona 2 7.7 Heidelberg 2 7.7 Infantis 2 7.7 Brandenburg 1 3.8 Senftenberg 1 3.8 Reading 1 3.8						Derby	2	25.0	(N=0)				(N=46)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg Muenchen Newport Worthington	12 3 3 1 1 1 1 1 1 1 1	26.1 6.5 6.5 2.2 2.2 2.2 2.2 2.2 2.2 2.2
Heidelberg 2 7.7 Infantis 2 7.7 Brandenburg 1 3.8 Senftenberg 1 3.8 Reading 1 3.8						Derby	2	25.0	(N=0)				(N=46)  Cecal (Sows)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg Muenchen Newport Worthington  Derby Typhimurium	12 3 3 1 1 1 1 1 1 1 1 1 1 2 3	26.1 6.5 6.5 2.2 2.2 2.2 2.2 2.2 2.2 2.2 11.5
Infantis 2 7.7 Brandenburg 1 3.8 Senftenberg 1 3.8 Reading 1 3.8						Derby	2	25.0	(N=0)				(N=46)  Cecal (Sows)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg Muenchen Newport Worthington  Derby Typhimurium I 4,[5],12:i:-	12 3 3 1 1 1 1 1 1 1 1 1 1 2 3 3 2	26.1 6.5 6.5 2.2 2.2 2.2 2.2 2.2 2.2 2.2 11.5
Brandenburg 1 3.8   Senftenberg 1 3.8   Reading 1 3.8						Derby	2	25.0	(N=0)				(N=46)  Cecal (Sows)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg Muenchen Newport Worthington  Derby Typhimurium I 4,[5],12:i:- Agona	12 3 3 1 1 1 1 1 1 1 1 1 2 3 2 2	26.1 6.5 6.5 2.2 2.2 2.2 2.2 2.2 2.2 2.2 11.5 7.7
Sentrenberg 1 3.8 Reading 1 3.8						Derby	2	25.0	(N=0)				(N=46)  Cecal (Sows)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg Muenchen Newport Worthington  Derby Typhimurium I 4,[5],12:i:- Agona Heidelberg	12 3 3 1 1 1 1 1 1 1 1 1 2 2 2 2	26.1 6.5 6.5 2.2 2.2 2.2 2.2 2.2 2.2 2.2 11.5 7.7 7.7
Reading 1 3.8						Derby	2	25.0	(N=0)				(N=46)  Cecal (Sows)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg Muenchen Newport Worthington  Derby Typhimurium I 4,[5],12:i:- Agona Heidelberg Infantis	12 3 3 1 1 1 1 1 1 1 1 1 2 2 2 2 2	26.1 6.5 6.5 2.2 2.2 2.2 2.2 2.2 2.2 2.2 11.5 7.7 7.7 7.7
						Derby	2	25.0	(N=0)				(N=46)  Cecal (Sows)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg Muenchen Newport Worthington  Derby Typhimurium I 4,[5],12:i:- Agona Heidelberg Infantis Brandenburg	12 3 3 1 1 1 1 1 1 1 1 1 2 2 2 2 2	26.1 6.5 6.5 2.2 2.2 2.2 2.2 2.2 2.2 2.2 11.5 7.7 7.7 7.7
						Derby	2	25.0	(N=0)				(N=46)  Cecal (Sows)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg Muenchen Newport Worthington  Derby Typhimurium I 4,[5],12:i:- Agona Heidelberg Infantis Brandenburg	12 3 3 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2	26.1 6.5 6.5 2.2 2.2 2.2 2.2 2.2 2.2 11.5 7.7 7.7 7.7 7.7 3.8
In 2012 and 2013, ESIS did not cample park products for Salmanalla because in prior years the parcent of park earcase camples positive for Salmanalla was consistently law						Derby	2	25.0	(N=0)				(N=46)  Cecal (Sows)	Typhimurium I 4,[5],12:i:- Infantis Anatum Brandenburg Give Johannesburg Muenchen Newport Worthington  Derby Typhimurium I 4,[5],12:i:- Agona Heidelberg Infantis Brandenburg Senftenberg	12 3 3 1 1 1 1 1 1 1 1 2 2 2 2 2 2 1 1	26.1 6.5 6.5 2.2 2.2 2.2 2.2 2.2 2.2 11.5 7.7 7.7 7.7 7.7 7.7 7.7 3.8 3.8

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 38	3. Non-Typhoidal Salmor	iella l	solate	s that are Resi	stant to ≥ 4 Ant	imicrobi	ai Cia	sses, by							
	Humans								Chickens			1			
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
l															
Humans (N=167)	I 4,[5],12:i:-	62	37.1	Retail Chickens	Typhimurium	37	84.1	HACCP (N=36)	Kentucky	28	77.8	Cecal (N=4)	Typhimurium	2	50.0
(N=107)	Typhimurium	48	28.7	(N=44)	Kentucky	6	13.6	(14=36)	Typhimurium	5	13.9	(N=4)	Heidelberg	1	25.0
	Dublin	11	6.6	()	Heidelberg	1	2.3		I 4,[5],12:i:-	1	2.8		Kentucky	1	25.0
	Newport	10	6.0						Enteritidis	1	2.8				
	Enteritidis	6	3.6						Heidelberg	1	2.8				
	Heidelberg	5	3.0												
	Infantis	4	2.4												
	Kentucky	3	1.8												
	Agona	2	1.2						Turkeys						
	Choleraesuis	2	1.2	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
	Paratyphi B var. L(+) tartrate+	2	1.2												
	IIIb 48:i:z	1	0.6	Retail	I 4,[5],12:i:-	6	40.0	HACCP	I 4,[5],12:i:-	4	36.4	Cecal	Albany	2	100.0
	Bredeney	1	0.6	Ground Turkey	Heidelberg	5	33.3	(N=11)	Albany	2	18.2	(N=2)			
	Indiana	1	0.6	(N=15)	Albany	1	6.7		Hadar	2	18.2				
	Lomalinda London	1	0.6		Dublin Infantis	1	6.7 6.7		Heidelberg Ohio	1	9.1 9.1				
	Reading	1	0.6		Typhimurium	1 1	6.7		Senftenberg	1 1	9.1				
	Senftenberg	1	0.6		туриничини	'	0.7		Senitenberg	'	3.1				
	Unknown serotype	3	1.8						Cattle						
	Partially serotyped	1	0.6	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
	Rough/Nonmotile isolates	1	0.6	Cource	Octotype		,,,	Cource	OCIOTYPE		,,,	Cource	Остотурс		,,,
	9			Retail	Dublin	4	100.0	HACCP	Dublin	18	32.7	Cecal	Typhimurium	8	38.1
				Ground Beef				(N=55)	Newport	10	18.2	(Beef)	Newport	6	28.6
				(N=4)					Typhimurium	8	14.5	(N=21)	Meleagridis	2	9.5
									Reading	6	10.9		Dublin	1	4.8
									I 4,[5],12:i:-	4	7.3		Heidelberg	1	4.8
									Meleagridis	4	7.3		Montevideo	1	4.8
									Montevideo Berta	2	3.6 1.8		Muenster	1	4.8 4.8
									Heidelberg	1	1.8		Uganda		4.0
									Ohio	1	1.8				
									01110		1.0	Cecal	Typhimurium	14	58.3
												(Dairy)	Newport	5	20.8
												(N=24)	Montevideo	2	8.3
													Give	1	4.2
													Meleagridis	1	4.2
													Ohio	1	4.2
									Swine			<u> </u>			
				Causas	Caratima		%	Source			%	Source	Caratima		%
				Source	Serotype	n	/0	Source	Serotype	n	/0	Source	Serotype	n	/6
				Retail	Typhimurium	3	60.0	HACCP <sup>1</sup>				Cecal	Typhimurium	10	55.6
				Pork Chops	I 4,[5],12:i:-	2	40.0	(N=0)				(Market Hogs)	I 4,[5],12:i:-	3	16.7
				(N=5)				(11-0)				(N=18)	Anatum	1	5.6
				1				I				l	Derby	1	5.6
				I				l				ĺ	Give	1	5.6
				I				l				ĺ	Infantis	1	5.6
				I				l				ĺ	Newport	1	5.6
				I				l							
I				1				I				Cecal	Infantis	2	22.2
				I				l				(Sows)	Typhimurium	2	22.2
								l				(N=9)	I 4,[5],12:i:-	1	11.1
															11.1
													Agona	1	
													Heidelberg	1	11.1

In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 39. Non-Typhoidal Salmonella Isolates that are Resistant to ≥ 5 Antimicrobial Classes, by Serotype, 2013

	Humans								Chickens						
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Source	Зеготуре	n	70	Source	Зеготуре	- 11	70	Source	Зеготуре	- 11	70	Source	Зеготуре	п	70
	The black of the	40	46.0	Retail	T bilancolous	34	85.0	НАССР	Mantanala.	04	75.0	Cecal	To see believe and come		66.7
Humans (N=87)	Typhimurium Dublin			Chickens	Typhimurium			(N=28)	Kentucky	21	17.9	(N=3)	Typhimurium	2	33.3
(14=07)		11	12.6	(N=40)	Kentucky	5	12.5	(20)	Typhimurium	5		(5)	Heidelberg	1	33.3
	Newport	10	11.5	, ,	Heidelberg	1	2.5		I 4,[5],12:i:-	1	3.6				
	Heidelberg	4	4.6						Heidelberg	1	3.6				
	Infantis	4	4.6					<u> </u>							
	I 4,[5],12:i:-	3	3.5						Turkeys						
	Agona	2	2.3	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
	Choleraesuis	2	2.3									١			
	Kentucky	2	2.3	Retail	Heidelberg	4	57.1	HACCP (N=2)	Heidelberg	1	50.0	Cecal (N=1)	Albany	1	100.0
	Paratyphi B var. L(+) tartrate+	2	2.3	Ground Turkey	Dublin	1	14.3	(14-2)	Ohio	1	50.0	(14=1)			
	Bredeney	1	1.2	(N=7)	Infantis	1	14.3								
	Enteritidis	1	1.2		Typhimurium	1	14.3								
	Indiana	1	1.2												
	London	1	1.2						Cattle						
	Senftenberg	1	1.2	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
	Unknown serotype	1	1.2												
	Partially serotyped	1	1.2	Retail	Dublin	4	100.0	HACCP	Dublin	17	37.0	Cecal	Newport	6	40.0
				Ground Beef (N=4)				(N=46)	Newport	10	21.7	(Beef) (N=15)	Typhimurium	5	33.3
				(14=4)					Typhimurium	7	15.2	(14=13)	Dublin	1	6.7
									Reading	6	13.0		Heidelbeg	1	6.7
									Montevideo	2	4.3		Montevideo	1	6.7
									Berta	1	2.2		Uganda	1	6.7
									Heidelberg	1	2.2				
									Meleagridis	1	2.2				
									Ohio	1	2.2				
												Cecal	Typhimurium	13	59.1
												(Dairy)	Newport	5	22.7
												(N=22)	Montevideo	2	9.1
													Give	1	4.5
													Ohio	1	4.5
													Onio	·	1.0
								<u> </u>	Swine			<u> </u>			
				Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
				Cource	остотурс		,,,	Cource	остотурс		,,,	Cource	остотурс		,,,
				Retail	Typhimurium	3	100.0	HACCP <sup>1</sup>				Cecal	Typhimurium	8	72.7
				Pork Chops	rypriimunum	J	100.0	(N=0)				(Market Hogs)	Give	1	9.1
				(N=3)				(14=0)				(N=11)	Infantis	1	9.1
													Newport	1	9.1
													Newport		5.1
												-			
												Cecal	Infantia	2	33.3
												(Sows)	Infantis		
												(N=6)	Agona	1	16.7
												l,	Heidelberg	1	16.7
												ĺ	Reading	1	16.7
												ĺ	Typhimurium	1	16.7
									ositive for Salmonella v						

In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

	Humans								Chickens						
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Humans (N=74)	Typhimurium Dublin Newport Heidelberg Agona	39 10 10 4 2	52.7 13.5 13.5 5.4 2.7	Retail Chickens (N=1)	Heidelberg	1	100.0	HACCP (N=1)	Kentucky	1	100.0	Cecal (N=0)			
	Choleraesuis	2	2.7						Turkeys			<u> </u>			
	Paratyphi B var. L(+) tartrate+	2	2.7	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
	l 4,[5],12:i:- Enteritidis Indiana Infantis Senftenberg	1 1 1 1	1.4 1.4 1.4 1.4 1.4	Retail Ground Turkey (N=3)	Dublin Infantis Typhimurium	1 1 1	33.3 33.3 33.3	HACCP (N=1)	Ohio	1	100.0	Cecal (N=0)			
									Cattle						
				Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
				Retail Ground Beef (N=3)	Dublin	3	100.0	HACCP (N=40)	Dublin Newport Typhimurium Reading Montevideo Berta Heidelberg Meleagridis Ohio	13 9 7 5 2 1 1 1	32.5 22.5 17.5 12.5 5.0 2.5 2.5 2.5 2.5	Cecal (Beef) (N=14)  Cecal (Dairy) (N=22)	Newport Typhimurium Dublin Heideliberg Montevideo Uganda  Typhimurium Newport Montevideo Give Ohio	6 4 1 1 1 1 1 5 2 1	42.9 28.6 7.1 7.1 7.1 7.1 59.1 22.7 9.1 4.5 4.5
									0						
				Source	Serotype	n	%	Source	Swine Serotype	n	%	Source	Serotype	n	%
				Retail Pork Chops (N=3)	Typhimurium	3	100.0	HACCP <sup>2</sup> (N=0)	S. Ciypo	-11		Cecal (Market Hogs) (N=9)	Typhimurium Give Infantis Newport	6 1 1	66.7 11.1 11.1 11.1
												Cecal (Sows) (N=6)	Infantis Agona Heidelberg Reading Typhimurium	2 1 1 1	33.3 16.7 16.7 16.7 16.7

ACSSuT = ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline

In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 41. Non-Typhoidal Salmonella Isolates that are at least ACT/S<sup>1</sup> Resistant, by Serotype, 2013

	Humans								Chickens	3					
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Humans	Agona	2	20.0	Retail Chickens				HACCP (N=0)				Cecal (N=0)			
(N=10)	Choleraesuis	2	20.0	(N=0)				(14=0)				(14=0)			
	I 4,[5],12:i:-	1	10.0	, ,											
	Dublin	1	10.0						Tomboon						
	Heidelberg Infantis	1	10.0				0/	1-	Turkeys		0/	1-			0/
	Newport	1	10.0 10.0	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
	Senftenberg	1			Dublin	1	100.0	НАССР				Cecal			
	Senitenberg	1	10.0	Retail Ground Turkey	Dublin	1	100.0	(N=0)				(N=0)			
				(N=1)				` '				, ,			
				,											
									Cattle			1			
				Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
				Retail				HACCP	Newport	2	66.7	Cecal	Heidelberg	1	50.0
				Ground Beef (N=0)				(N=3)	Ohio	1	33.3	(Beef) (N=2)	Uganda	1	50.0
				(14=0)								(14-2)			
												Cecal (Dairy)	Give	1	100.0
												(N=1)			
												` ,			
									Swine						
				Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
				Retail				HACCP <sup>1</sup>				Cecal			
				Pork Chops				(N=0)				(Market Hogs	s)		
				(N=0)								(N=0)			
I												Cecal	Agona	1	50.0
I												(Sows) (N=2)	Infantis	1	50.0
												(2)			
I												1			

<sup>&</sup>lt;sup>1</sup> ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole
<sup>2</sup> In 2012 and 2013, FSIS did not sample pork products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

	Humans								Chickens						
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Humans	Dublin	10	32.3	Retail				HACCP	Kentucky	1	100.0	Cecal			
(N=31)	Newport	10	32.3	Chickens				(N=1)				(N=0)			
	Typhimurium	7	22.6	(N=0)											
	Agona	1	3.2												
	Heidelberg	1	3.2												
	Infantis	1	3.2						Turkeys						
	Senftenberg	1	3.2	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
				Retail	Dublin	1	50.0	HACCP				Cecal			
				<b>Ground Turkey</b>	Infantis	1	50.0	(N=0)				(N=0)			
				(N=2)											
									Cattle						
				Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
				Cource	остотурс		70	Oource	остотурс	- "	70	Cource	Остотурс	- "	/0
				Retail	Dublin	3	100.0	HACCP	Dublin	13	33.3	Cecal	Newport	6	50.0
				Ground Beef				(N=39)	Newport	9	23.1	(Beef)	Typhimurium	2	16.7
				(N=3)					Typhimurium	7	17.9	(N=12)	Dublin	1	8.3
									Reading	5	12.8		Heidelberg	1	8.3
									Montevideo	2	5.1		Montevideo	1	8.3
									Berta	1	2.6		Uganda	1	8.3
									Heidelberg	1	2.6		oganaa	-	
									Ohio	1	2.6				
									Offic	·	2.0	Cecal	Typhimurium	11	55.0
												(Dairy)	Newport	5	25.0
												(N=20)	Montevideo	2	10.0
													Give	1	5.0
															5.0
													Ohio	1	5.0
									Swine						
				Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
				Retail	Tarking	•	100.0	,				Cecal	Chia		22.0
				Pork Chops	Typhimurium	3	100.0	HACCP <sup>2</sup>				(Market Hogs)	Give	1	33.3
				(N=3)				(N=0)				(N=3)	Infantis	1	33.3
				, ,								` '	Newport	1	33.3
				1								Cecal	Infantis	2	40.0
												(Sows)	Agona	1	
												(Sows) (N=5)	Agona Heidelberg	1	20.0 20.0 20.0

Table 43. Non-Typhoidal Salmonella Isolates that are at least Ceftriaxone and Nalidixic Acid Resistant, by Serotype, 2013

	Humans								Chickens						
Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
Humans (N=5)	Infantis Agona Dublin Enteritidis	2 1 1	40.0 20.0 20.0 20.0	Retail Chickens (N=0)				HACCP (N=0)				Cecal (N=0)			
									Turkeys						
				Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
				Retail Ground Turkey (N=0)				HACCP (N=0)				Cecal (N=0)			
									Cattle						
				Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
				Retail Ground Beef (N=0)				HACCP (N=6)	Dublin Typhimurium	4 2	66.7 33.3	Cecal (Beef) (N=1)	Heidelberg	1	100.0
												Cecal (Dairy) (N=1)	Give	1	100.0
									Swine						
				Source	Serotype	n	%	Source	Serotype	n	%	Source	Serotype	n	%
				Retail Pork Chops (N=0)				HACCP <sup>1</sup> (N=0)				Cecal (Market Hogs) (N=1)	Give	1	100.0
												Cecal (Sows) (N=1)	Heidelberg	1	100.0

<sup>1</sup> In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

In 2012 and 2013, FSIS did not sample pork products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

l able 44. Distribution of	MICS and Occurrence	of Resistance to Selected Isolate Source	peta-Lactam A	gents a	mong Non-	i yphoidal <i>Sa</i>	imone	iia Iso	iates F	cesista						2012				
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%I <sup>1</sup> (or S-DD <sup>2</sup> )	%R <sup>3</sup>	[95% CI] <sup>4</sup>	0.015 0.03	0.06	0.125	0.25	0.50	Distri 1	bution (	%) of M	IICs (µg 8	mi) - 16	32	64	128	256	512 102
β-Lactam/β-Lactamase Inhibitor Combinations	Piperacillin-tazobactam	Humans (64)	9.4	6.3	[1.7 - 15.2]							3.1	12.5	56.3	12.5	7.8	1.6	3.1	3.1	
		Retail Chickens (66)	1.5	0.0	[0.0 - 5.4]							43.9	48.5	6.1			1.5			
		E HACCP (97)	1.0	2.1	[0.3 - 7.3]						2.1	41.2	40.2	11.3	2.1	1.0			2.1	
		Retail Ground Turkey (14)	7.1	0.0	[0.0 - 23.2]							14.3	14.3	42.9	21.4		7.1			
		HACCP (28)	0.0	0.0	[0.0 - 12.3]							10.7	57.1	28.6	3.6					
		Retail Ground Beef (3)	0.0	0.0	[0.0 - 70.8]							33.3	66.7							
		Retail Ground Beef (3) HACCP (31)	13.0	3.2	[0.1 - 16.7]						6.5	6.5	32.3	25.8	12.9	6.5	6.5	3.2		
Cephems	Cefepime	Humans (64)	4.7	0.0	[0.0 - 5.6]			1.6	12.5	56.3	17.2	7.8	1.6	3.1						
		Retail Chickens (66)	0.0	0.0	[0.0 - 5.4]		6.1	12.1	48.5	28.8	3.0	1.5								
		HACCP (97)	0.0	0.0	[0.0 - 3.7]		3.1	15.5	50.5	22.7	7.2	1.0								
		Retail Ground Turkey (14)	0.0	0.0	[0.0 - 23.2]		7.1	7.1	14.3	35.7	35.7									
		를 HACCP (28)	0.0	0.0	[0.0 - 12.3]		3.6	7.1	28.6	53.6	3.6	3.6								
		Retail Ground Beef (3)	0.0	0.0	[0.0 - 70.8]		33.3		33.3	33.3										
		HACCP (31)	3.2	0.0	[0.0 - 11.2]			9.7	16.1	38.7	25.8	6.5	3.2							
	Cefotaxime	Humans (64)	0.0	100.0	[94.4 - 100.0]								3.1	4.7	50.0	34.4	4.7	1.6	1.6	
		Retail Chickens (66)	4.5	89.4	[79.4 - 95.6]		3.0	3.0				4.5	34.8	21.2	31.8		1.5			
		HACCP (97)	6.2	91.8	[84.4 - 96.4]		2.1					6.2	12.4	19.6	50.5	7.2	1.0	1.0		
		S Retail Ground Turkey (14)	0.0	92.9	[66.1 - 99.8]		7.1						7.1		28.6	50.0	7.1			
		불 HACCP (28)	3.6	92.9	[76.5 - 99.1]			3.6				3.6		7.1	32.1	53.6				
		<u>∞</u> Retail Ground Beef (3)	0.0	66.7	[9.4 - 99.2]		33.3								66.7					
		HACCP (31)	3.2	96.8	[83.3 - 99.9]							3.2	3.2	9.7	35.5	38.7	9.7			
	Ceftazidime	Humans (64)	4.7	90.6	[80.7 - 96.5]								4.7	4.7	40.6	37.5	9.4	3.1		
		Retail Chickens (66)	36.4	53.0	[40.3 - 65.4]				4.5	1.5			4.5	36.4	39.4	12.1	1.5			
		HACCP (97)	11.3	75.3	[65.5 - 83.5]			1.0	1.0				11.3	11.3	61.9	9.3	3.1	1.0		
		S Retail Ground Turkey (14)	7.1	85.7	[57.2 - 98.2]				7.1					7.1	21.4	57.1	7.1			
		HACCP (28)	0.0	92.9	[76.5 - 99.1]					3.6			3.6		28.6	46.4	17.9			
		Retail Ground Beef (3)	33.3	33.3	[0.8 - 90.6]				33.3					33.3	33.3					
		HACCP (31)	3.2	90.3	[74.2 - 98.0]								6.5	3.2	35.5	41.9	12.9			
Monobactam	Aztreonam	Humans (64)	56.3	28.1	[17.6 - 40.8]					1.6		1.6	12.5	56.3	18.8	7.8	1.6			
		Retail Chickens (66)	19.7	1.5	[0.0 - 8.2]		4.5	1.5		4.5		30.3	37.9	19.7	1.5					
		HACCP (97)	23.7	5.2	[1.7 - 11.6]		2.1			3.1	11.3	15.5	39.2	23.7	3.1	1.0	1.0			
		Retail Ground Turkey (14)	21.4	50.0	[23.0 - 77.0]		7.1					7.1	14.3	21.4	50.0					
		HACCP (28)	25.0	53.6	[33.9 - 72.5]			3.6			3.6	0.0	14.3	25.0	53.6					
		Retail Ground Beef (3)	0.0	0.0	[0.0 - 70.8]		33.3						66.7							
		Retail Ground Beer (3) HACCP (31)	38.7	16.1	[5.5 - 33.7]					3.2	6.5	9.7	25.8	38.7	16.1					
Penems	Imipenem	Humans (64)	0.0	0.0	[0.0 - 5.6]			3.1	56.3	40.6										
		Retail Chickens (66)	0.0	0.0	[0.0 - 5.4]			4.5	53.0	42.4										
		HACCP (97)	0.0	0.0	[0.0 - 3.7]		1.0	2.1	60.8	32.0	4.1									
		Retail Ground Turkey (14)	0.0	0.0	[0.0 - 23.2]				71.4	28.6										
		HACCP (28)	0.0	0.0	[0.0 - 12.3]				75.0	21.4	3.6									
		e Retail Ground Beef (3)	0.0	0.0	[0.0 - 70.8]				100.0											
		HACCP (31)	0.0	0.0	[0.0 - 11.2]			9.7	22.6	67.7										

Percent of isolates with intermediate susceptibility

Percent of isolates that are susceptible-dose dependent (S-DD). Cefepime MIC's above the susceptible range but below the resistant range are designated by CLSI to be S-DD.

Percent of isolates that are susceptible-dose dependent (S-DD). Cefepime MIC's above the susceptible range but below the resistant range are designated by CLSI to be S-DD.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %s, to the right of the double vertical bars, are due to rounding.

PS% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method.

The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

Antimicrobial Class	Antimicrobial Agent	Isolate Source (# of Isolates)	%I <sup>1</sup> (or S-DD <sup>2</sup> )	%R³	[95% CI] <sup>4</sup>	0.015 0.0	3 0.06	0.125	0.25	0.50	Distri 1	ibution ( 2	%) of M 4	ICs (µg/ 8	/ml) <sup>5</sup> 16	32	64	128	256	512	1024
β-Lactam/β-Lactamase Inhibitor Combinations	Piperacillin-tazobactam	Humans (55)	10.9	1.8	[0.0 - 9.7]							5.5	25.5	40.0	16.4	3.6	7.3	1.8			
innibitor Combinations		Retail Chickens (41)	0.0	0.0	[0.0 - 8.6]							39.0	56.1	4.9							
		S Cecal (4)	25.0	0.0	[0.0 - 60.2]							25.0	50.0	7.5		25.0					
		Retail Ground Turkey (10)	10.0	10.0	[0.3 - 44.5]							10.0	20.0	40.0	10.0		10.0		10.0		
		등 Cecal (2)	0.0	0.0	[0.0 - 84.2]							10.0	50.0	50.0	10.0		10.0		10.0		
		Retail Ground Beef (4)	0.0	25.0	[0.6 - 80.6]							50.0		25.0				25.0			
		# Cecal (Beef) (13)	15.4	0.0	[0.0 - 24.7]								15.4	61.5	7.7	7.7	7.7				
		Cecal (Dairy) (21)	4.8	0.0	[0.0 - 16.1]								33.3	33.3	28.6		4.8				
		Cecal (Market Hogs) (6) Cecal (Sows) (7)	0.0	0.0 0.0	[0.0 - 45.9] [0.0 - 41.0]								50.0 28.6	33.3 57.1	16.7 14.3						
Cephems	Cefepime	Humans (55)	3.6	1.8	[0.0 - 9.7]			3.6	16.4	58.2	10.9	5.5	1.8	1.8	1.8						
·	· ·	g Retail Chickens (41)	0.0	0.0	[0.0 - 8.6]			14.6	48.8	31.7	4.9										
		Ö Cecal (4)	0.0	0.0	[0.0 - 60.2]			25.0	25.0	50.0	4.5										
		Retail Ground Turkey (10)	0.0	10.0	[0.3 - 44.5]				10.0	30.0	50.0						10.0				
		Cecal (2)	0.0	0.0	[0.0 - 84.2]				10.0	100.0	30.0						10.0				
		Retail Ground Beef (4)	0.0	0.0	[0.0 - 60.2]			25.0	25.0	25.0	25.0										
		Cecal (Beef) (13)	0.0	0.0	[0.0 - 24.7]				53.8	15.4	30.8										
		Cecal (Dairy) (21)	0.0	0.0	[0.0 - 16.1]				33.3	52.4	14.3										
		Cecal (Market Hogs) (6) Cecal (Sows) (7)	16.7 0.0	0.0	[0.0 - 45.9] [0.0 - 41.0]				33.3 28.6	33.3 14.3	16.7 57.1			16.7							
	Cefotaxime	Coodi (Collo) (1)	0.0	100.0	[93.5 - 100.0]				20.0	14.5	37.1		1.8	10.9	43.6	36.4	5.5	1.8			
	Celotaxime	Humans (55)	1													30.4	3.3	1.0			
		Retail Chickens (41)	0.0	97.6 100.0	[87.1 - 99.9] [39.8 - 100.0]						2.4		31.7 25.0	39.0 25.0	26.8 25.0	25.0					
													23.0								
		Retail Ground Turkey (10)  Cecal (2)	0.0	90.0	[55.5 - 99.7]					10.0				10.0	40.0	30.0		10.0			
		1 2333.(2)	0.0	100.0	[15.8 - 100.0]								05.0		50.0	100.0					
		Retail Ground Beef (4)  Cecal (Beef) (13)	0.0	100.0 100.0	[39.8 - 100.0] [75.3 - 100.0]								25.0	23.1	50.0 53.8	7.7	25.0 15.4				
		Cecal (Dairy) (21)	0.0	100.0	[83.9 - 100.0]									19.0	42.9	33.3	4.8				
		Cecal (Market Hogs) (6) Cecal (Sows) (7)	0.0	100.0 100.0	[54.1 - 100.0]									16.7 14.3	50.0 42.9	33.3 42.9					
	Out the second state of				[59.0 - 100.0]							2.0	4.0			47.3	16.4				
	Ceftazidime	Humans (55)	5.5	89.1	[77.8 - 95.9]							3.6	1.8	5.5	25.5		10.4				
		Retail Chickens (41)	51.2	43.9	[28.5 - 60.3]								4.9	51.2	39.0	4.9					
			25.0	50.0	[6.8 - 93.2]								25.0	25.0	25.0	25.0					
		Retail Ground Turkey (10) Cecal (2)	10.0	80.0	[44.4 - 97.5]					10.0				10.0	40.0	40.0					
			0.0	100.0	[15.8 - 100.0]											100.0					
		Retail Ground Beef (4)	25.0 0.0	50.0 100.0	[6.8 - 93.2] [75.3 - 100.0]								25.0	25.0	25.0 76.9	25.0 15.4	7.7				
		Cecal (Dairy) (21)	9.5	90.5	[69.6 - 98.8]									9.5	71.4	19.0					
		Cecal (Market Hogs) (6)	0.0	83.3	[35.9 - 99.6]								16.7		50.0	33.3					
		Coodi (Cono) (1)	0.0	100.0	[59.0 - 100.0]										42.9	57.1					
Monobactam	Aztreonam	Humans (55)	43.6	32.7	[20.7 - 46.7]						3.6		20.0	43.6	21.8	9.1	1.8				
		Retail Chickens (41)	12.2	0.0	[0.0 - 8.6]					2.4	4.9	43.9	36.6	12.2							
		Cecal (4)	25.0	25.0	[0.6 - 80.6]						25.0	25.0		25.0							
		Retail Ground Turkey (10)	60.0	20.0	[2.5 - 55.6]			10.0		10.0				60.0	10.0		10.0				
		E Cecal (2)	50.0	50.0	[1.3 - 98.7]									50.0	50.0						
		Retail Ground Beef (4)  Cecal (Beef) (13)	0.0 46.2	25.0 15.4	[0.6 - 80.6] [1.9 - 45.4]					25.0	25.0		25.0 38.5	46.2	25.0 7.7	7.7					
		Cecal (Dairy) (21)	42.9	28.6	[11.3 - 52.2]								28.6	42.9	23.8	4.8					
		Cecal (Market Hogs) (6)	66.7	33.3	[4.3 - 77.7]									66.7	33.3						
		Oddai (Collo) (1)	42.9	42.9	[9.9 - 81.6]							1 1	14.3	42.9	42.9						
Penems	Imipenem	Humans (55)	0.0	0.0	[0.0 - 6.5]		1.8	7.3	87.3	3.6											
		Retail Chickens (41)	0.0	0.0	[0.0 - 8.6]				26.8	73.2											
		Č Cecal (4)	0.0	0.0	[0.0 - 60.2]				50.0	50.0											
		Retail Ground Turkey (10)	0.0	0.0	[0.0 - 30.8]				70.0	30.0											
		Cecal (2)	0.0	0.0	[0.0 - 84.2]				100.0												
		Retail Ground Beef (4)  Cecal (Beef) (13)	0.0	0.0	[0.0 - 60.2] [0.0 - 24.7]				84.6	100.0 15.4											
		Cecal (Beel) (13) Cecal (Dairy) (21)	0.0	0.0	[0.0 - 24.7]				81.0	19.0											
		© Cecal (Market Hogs) (6)	0.0	0.0	[0.0 - 45.9]				66.7	33.3											
		Cecal (Sows) (7)	0.0	0.0	[0.0 - 41.0]				85.7	14.3											

<sup>Percent of isolates with intermediate susceptibility

Percent of isolates with intermediate susceptibile dose dependent (S-DD). Cefepime MIC's above the susceptible range but below the resistant range are designated by CLSI to be S-DD.

Percent of isolates that are susceptible-dose dependent (S-DD). Cefepime MIC's above the susceptible range but below the resistant range are designated by CLSI to be S-DD.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %s, to the right of the double vertical bars, are due to rounding.

PS% confidence intervals for percent resistant (%R) were calculated using the Clooper-Pearson exact method

The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.</sup> 

Year			U	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	sted	S	Humans	337	257	271	384	412	385	442	410	513	391	364	382
		Chickens	Retail Chickens HACCP Cecal	8 48	3 42	3 84	12 173	17 188	13 124	30 116	27 118	28 152	21 134	26 203	25 79 6
		ske	Retail Ground Turkey	5	1	0	0	0	0	2	0	0	1	4	2
		Turke	HACCP Cecal	0	0	0	0	3	0	1	0	1	0	1	1
			Retail Ground Beef	1	1	0	0	0	0	1	0	1	0	0	0
		Cattle	HACCP	6	3	2	2	2	4	5	0	1	0	1	1
		O	Cecal (Beef) Cecal (Dairy)												0
		ө	Retail Pork Chops	0	0	0	0	0	0	0	0	0	0	0	0
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	1	1	1	0	0	1	0	0	0	0		0
	Antimicrobial		Cecal (Sows)												1
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
Aminoglycosides	Gentamicin (MIC ≥ 16 µg/mI)		Humans	0.3%	0.4%	0.4%	0.8% 3	0.2% 1	0.0%	0.2%	0.0%	0.2% 1	0.5% 2	0.0%	0.0%
	(о = то ру)	s	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	1.3%
		ਹ	Cecal			,									0.0%
			Retail Ground Turkey	0.0%	0.0%					0.0%			0.0%	0.0%	0.0%
		Turkeys	HACCP	0				0.0%		0.0%		0.0%	U	0.0%	0.0%
		Ţ	Cecal							3					0.0%
			Retail Ground Beef	0.0%	0.0%					0.0%		0.0%			Ť
		9	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%		0.0%	0.0%
		Cattle	Cecal (Beef)	0		0	0	0	0	0		0			
			Cecal (Dairy)												
			Retail Pork Chops												
		9	HACCP	0.0%	0.0%	0.0%			0.0%						
		Swine	Cecal (Market Hogs)	0	0	0			0						
			Cecal (Sows)												0.0%
	Kanamycin		Humans	0.3%	0.0%	0.7%	0.3%	0.2%	0.5%	0.0%	0.2%	0.2%	0.3%	0.0%	0.0%
	(MIC ≥ 64 μg/mI)	-	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	2.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	0.0%
		Chio	Cecal	1	0	0	0	0	0	0	0	1	0	0	0.0%
			Retail Ground Turkey	0.0%	0.0%					0.0%			0.0%	0.0%	0.0%
		Turkeys	HACCP	0	0			0.0%		0.0%		0.0%	0	0.0%	0.0%
		Ę	Cecal					0		0		0		0	0.0%
			Retail Ground Beef	0.0%	0.0%					0.0%		0.0%	0.0%		0
			HACCP	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%		0 100.0%	0	0.0%	0.0%
		Cattle		0	0	0	0	1	0	0		1		0	0
			Cecal (Beef)												
		$\vdash$	Cecal (Dairy)												
			Retail Pork Chops HACCP	0.0%	0.0%	0.0%			0.0%						
		Swine		0	0	0			0						
			Cecal (Sows)												0.0%
	Streptomycin		Cecal (Sows)	1.5%	1.2%	2.2%	1.0%	1.2%	0.5%	0.7%	1.2%	0.6%	1.8%	1.9%	2.6%
	(MIC ≥ 64 μg/mI)	-	Humans Potail Chickons	5 0.0%	0.0%	6	0.0%	5 0.0%	0.0%	3.3%	5 0.0%	3	7 14.3%	7 0.0%	10
		(ens	Retail Chickens	2.1%	0.0%	0	0.6%	0.0%	0.8%	1 0.0%	0.0%	0	3	0	0 2.5%
		Chickens	HACCP	1	0	1	1	0	1	0	0	2	0	3	0.0%
		-	Cecal	0.0%	0.0%					0.0%			0.0%	0.0%	0.0%
		eys	Retail Ground Turkey	0	0			0.0%		0.0%		0.0%	0	0.0%	0.0%
		Turkeys	HACCP					0		0.070		0		0	0.0%
		$\vdash$	Cecal	0.0%	0.0%					0.0%		0.0%	0.0%		0.070
			Retail Ground Beef	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%		0 100.0%	0.0%	0.0%	0.0%
		Cattle	HACCP	0.0%	0.0%	0.0%	0.0%	1	0.0%	0.0%		1		0.0%	0.0%
		0	Cecal (Beef)												
		_	Cecal (Dairy)												
			Retail Pork Chops	0.001	0.001	0.001			0.001						
		Swine	HACCP	0.0%	0.0%	0.0% 0			0.0%						
		S	Cecal (Market Hogs)												
			Cecal (Sows)												0.0%

In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 46b. Antimicrobial Resistance among Salmonella Enteritidis Isolates, 2002-2013

Table 46b. Antimicro	bial Resistance amo	ong	Salmonella Enterit	idis Isola 2002	tes, 2002 2003		2005	2006	2007	2000	2000	2010	2014	2012	2042
Year Number of Isolates Test	ed		Humans	337	2003 257	<b>2004</b> 271	384	<b>2006</b> 412	<b>2007</b> 385	<b>2008</b> 442	<b>2009</b> 410	<b>2010</b> 513	<b>2011</b> 391	<b>2012</b> 364	<b>2013</b> 382
or residues resi		sus	Retail Chickens	8	3	3	12	17	13	30	27	28	21	26	25
		Chicke	HACCP	48	42	84	173	188	124	116	118	152	134	203	79
		S	Cecal	_				_							6
		rkey	Retail Ground Turkey HACCP	5 0	0	0	0	0 3	0	2	0	0	0	4 1	2
		Ţ	Cecal												1
		Ф	Retail Ground Beef	1	1	0	0	0	0	1	0	1	0	0	0
		Cattle	HACCP Cecal (Beef)	6	3	2	2	2	4	5	0	1	0	1	0
			Cecal (Dairy)												0
		Ф	Retail Pork Chops	0	0	0	0	0	0	0	0	0	0	0	0
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	1	1	1	0	0	1	0	0	0	0		0
			Cecal (Sows)												1
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class β-Lactam/β-Lactamase	Breakpoint) Amoxicillin-		Source	0.6%	0.0%	0.0%	0.8%	0.5%	0.5%	0.0%	0.0%	0.4%	0.3%	0.5%	0.0%
Inhibitor Combinations	Clavulanic Acid (MIC ≥ 32 / 16 µg/ml)		Humans	0.0%	33.3%	33.3%	3	0.0%	0.0%	0.0%	0 3.7%	0.0%	1 0.0%	0.0%	0.0%
	(MIC 2 32 / 10 µg/III)	SUS	Retail Chickens	0	1	1	0	0	0	0	1	0	0	0	0
		Chickens	HACCP	4.2% 2	0.0% 0	1.2% 1	0.6% 1	0.0%	0.0% 0	0.9% 1	0.8% 1	0.0% 0	0.7% 1	0.5% 1	0.0% 0
		O	Cecal												0.0%
			Retail Ground Turkey	0.0%	0.0%					0.0%			0.0%	0.0%	0.0%
		Turkeys	HACCP					0.0%		0.0%		0.0%		0.0%	0.0%
		1	Cecal					U		0		U		U	0.0%
			Retail Ground Beef	0.0%	0.0%					0.0%		0.0%			0
				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%		0.0%	0.0%
		Cattle	HACCP	0	0	0	0	0	0	0		0		0	0
		0	Cecal (Beef)												
			Cecal (Dairy)												
			Retail Pork Chops												
		e e	HACCP	0.0%	0.0%	0.0%			0.0%						
		Swine	Cecal (Market Hogs)			- J									
			Cecal (Sows)												0.0%
Cephems	Cefoxitin	<del>                                     </del>	Humans	0.0%	0.0%	0.0%	1.0%	0.5%	0.3%	0.0%	0.0%	0.0%	0.3%	0.5%	0.0%
	(MIC ≥ 32 μg/ml)		1	0.0%	0 33.3%	0 33.3%	4 0.0%	0.0%	0.0%	0.0%	0 3.7%	0.0%	0.0%	0.0%	0.0%
		ens	Retail Chickens	2.1%	0.0%	1.2%	0.6%	0.0%	0.0%	0.9%	0.0%	0.0%	0.7%	0.5%	0.0%
		Chickens	HACCP	1	0	1	1	0	0	1	0	0	1	1	0.0%
			Cecal												0
		s/	Retail Ground Turkey	0.0% 0	0.0% 0					0.0% 0			0.0%	0.0% 0	0.0%
		Turke	HACCP					0.0%		0.0% 0		0.0%		0.0%	0.0%
		-	Cecal												0.0%
			Retail Ground Beef	0.0% 0	0.0%					0.0% 0		0.0%			
		Ф	HACCP	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%		0.0%		0.0%	0.0%
		Cattle	Cecal (Beef)	0	0	0	0	1	0	0		0		0	0
		-	Cecal (Dairy)												
			Retail Pork Chops	0.0%	0.0%	0.0%			0.0%						
		Swine	HACCP	0.0%	0.0%	0.0%			0.0%						
		Ø	Cecal (Market Hogs)												
			Cecal (Sows)												0.0% 0
	Ceftiofur (MIC ≥ 8 µg/mI)	L	Humans	0.0%	0.0%	0.0%	0.3% 1	0.5% 2	0.3% 1	0.2% 1	0.0%	0.0%	0.3% 1	0.5% 2	0.3% 1
		ý	Retail Chickens	0.0%	33.3%	33.3%	0.0%	0.0%	0.0%	0.0%	3.7%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	4.2%	0.0%	1.2%	1.2%	0.0%	0.0%	0.9%	0.8%	1.3%	0.7%	0.5%	0.0%
		Ę.	Cecal		U	1		U	U						0.0%
		-	Retail Ground Turkey	0.0%	0.0%					0.0%			0.0%	0.0%	0.0%
		Turkeys	HACCP	0	0			0.0%		0.0%		0.0%	0	0.0%	0.0%
		Ę						0		0		0		0	0.0%
			Cecal	0.0%	0.0%					0.0%		0.0%			0.070
			Retail Ground Beef	0	0	0.004	0.004	E0.00/	0.004	0		0		0.004	0.004
		Cattle	HACCP	0.0%	0.0% 0	0.0%	0.0% 0	50.0% 1	0.0% 0	0.0% 0		0.0% 0		0.0% 0	0.0%
		ပ္မ	Cecal (Beef)												
	1	1	Cecal (Dairy)												
			())												
		-	Retail Pork Chops												
		9	Retail Pork Chops	0.0%	0.0%	0.0%			0.0%						
		Swine	Retail Pork Chops HACCP	0.0%	0.0%	0.0%			0.0%						
		Swine	Retail Pork Chops												0.0%

In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 46c. Antimicrobial Resistance among Salmonella Enteritidis Isolates, 2002-2013

Year	otod		Humana	<b>2002</b> 337	<b>2003</b> 257	<b>2004</b> 271	<b>2005</b> 384	<b>2006</b> 412	<b>2007</b> 385	<b>2008</b> 442	<b>2009</b> 410	<b>2010</b> 513	<b>2011</b> 391	<b>2012</b> 364	<b>2013</b> 382
Number of Isolates Te	stea	su	Humans Retail Chickens	8	3	3	12	17	13	30	27	28	21	26	25
		Chickens	HACCP	48	42	84	173	188	124	116	118	152	134	203	79
			Cecal	_											6
		Turkeys	Retail Ground Turkey HACCP	5 0	0	0	0	0 3	0	2 1	0	0	0	4 1	2
		Ţ	Cecal												1
		0	Retail Ground Beef	1	1	0	0	0	0	1	0	1	0	0	0
		Cattle	HACCP Cecal (Beef)	6	3	2	2	2	4	5	0	1	0	1	1 0
			Cecal (Dairy)												0
		Φ	Retail Pork Chops	0	0	0	0	0	0	0	0	0	0	0	0
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	1	1	1	0	0	1	0	0	0	0		0
	Antimicrobial		Cecal (Sows)												1
	(Resistance		Isolate												
entimicrobial Class Cephems	Breakpoint) Ceftriaxone		Source	0.0%	0.0%	0.0%	0.3%	0.5%	0.3%	0.2%	0.0%	0.0%	0.3%	0.5%	0.3%
•	(MIC ≥ 4 μg/mI)		Humans	0.0%	0 33.3%	0 33.3%	1 0.0%	2 0.0%	1 0.0%	1 0.0%	0 3.7%	0 3.6%	1 0.0%	0.0%	1 0.0%
		sus	Retail Chickens	0	1	1	0	0	0	0	1	1	0	0	0
		Chickens	HACCP	4.2% 2	0.0% 0	1.2% 1	0.6% 1	0.0%	0.0%	0.9% 1	0.8% 1	0.6% 1	0.7% 1	0.5% 1	0.0%
		O	Cecal												0.0%
			Retail Ground Turkey	0.0%	0.0%					0.0%			0.0%	0.0%	0.0%
		Turkeys	HACCP	0	0			0.0%		0.0%		0.0%	0	0.0%	0.0%
		Ţ	Cecal					0		0		0		0	0.0%
		-		0.0%	0.0%					0.0%		0.0%			0
			Retail Ground Beef	0	0.0%	0.00/	0.09/	50.09/	0.09/	0		0.0%		0.007	0.00
		Cattle	HACCP	0.0%	0.0%	0.0% 0	0.0% 0	50.0% 1	0.0% 0	0.0%		0.0%		0.0% 0	0.0%
		ථි	Cecal (Beef)												
			Cecal (Dairy)												
			Retail Pork Chops												
			HACCP	0.0%	0.0%	0.0%			0.0%						
		Swine		0	0	0			0						
		0)	Cecal (Market Hogs)												0.00/
			Cecal (Sows)												0.0%
olate Pathway Inhibit	Sulfamethoxazole/ Sulfisoxazole <sup>2</sup>		Humans	1.5% 5	1.2%	1.8% 5	1.6% 6	1.5% 6	1.6% 6	1.4% 6	1.7% 7	1.9% 10	2.0%	2.7% 10	1.6% 6
	(MIC ≥ 512 μg/mI)		Retail Chickens	0.0%	0.0%	33.3%	0.0%	0.0%	0.0%	3.3%	3.7%	0.0%	9.5%	0.0%	0.0%
		Chickens	HACCP	4.2%	2.4%	1.2%	0.0%	0.0%	0.8%	0.9%	0.0%	2.0%	0.0%	0.0%	2.5%
		SP	Cecal	2	1	1	0	0	1	1	0	3	0	0	0.0%
				0.0%	0.0%					50.0%			0.0%	0.0%	0.0%
		ys	Retail Ground Turkey	0	0			0.00/		1 0.0%		0.00/	0	0.0%	0.0%
		Turkeys	HACCP					0.0% 0		0.0%		0.0% 0		0.0%	0
		Ľ	Cecal												0.0%
			Retail Ground Beef	0.0% 0	0.0%					0.0%		0.0%			
		0	HACCP	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%		0.0%		0.0%	0.0%
		Cattle	Cecal (Beef)	0	0	0	0	1	0	0		0		0	0
		<u> </u>	Cecal (Dairy)												
			Retail Ground Turkey												
		ine	HACCP	0.0% 0	0.0% 0	0.0%			0.0% 0						
		Sw	Cecal (Market Hogs)												
			Cecal (Sows)												0.0%
	Trimethoprim-	+	Humans	0.6%	0.8%	0.0%	0.5%	0.5%	1.0%	0.9%	0.7%	1.0%	0.5%	1.1%	0.5%
	Sulfamethoxazole (MIC ≥ 4 / 76 µg/mI)	-	1	0.0%	0.0%	0.0%	2 0.0%	0.0%	4 0.0%	4 0.0%	3.7%	5 0.0%	0.0%	4 0.0%	0.0%
		ens	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1 0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0
		Ľ	Cecal												0.0%
		(n	Retail Ground Turkey	0.0%	0.0%					0.0%			0.0%	0.0%	0.0%
		Turkeys	HACCP					0.0%		0.0%		0.0% 0		0.0%	0.0%
		Ţ	Cecal					0		J.		U			0.0%
		-	Retail Ground Beef	0.0%	0.0%					0.0%		0.0%			0
				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%		0.0%	0.0%
		Cattle	HACCP	0.078	0.078	0.0%	0.076	0.076	0.0%	0.076		0.076		0.078	0.07
		ď	Cecal (Beef)												
			Cecal (Dairy)												
			Retail Pork Chops												
		<u>o</u>	HACCP	0.0%	0.0%	0.0%			0.0%						
		Swine	Cecal (Market Hogs)	U	U	U			U						
			Cecal (Sows)												0.0%
			Occai (SUWS)			oork carcass									0

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low <sup>2</sup> Sulfamethoxazole was tested from 1996-2003 and was replaced by sulfisoxazole in 2004

Table 46d. Antimicrobial Resistance among Salmonella Enteritidis Isolates, 2002-2013

Number of Isolates Teste	ed	Chickens	Retail Chickens HACCP	337 8 48	257 3 42	271 3 84	384 12	412 17	385 13	30 442	410 27	513 28	391 21	364 26	382 25
		Chickens	HACCP												25
			Cocol			0-1	173	188	124	116	118	152	134	203	79 6
		Turkeys	Cecal Retail Ground Turkey HACCP	5 6	1 3	0 2	0 2	0 2	0 4	2 5	0	0 1	1 0	4 1	2
		Ĕ	Cecal  Retail Ground Beef	1	1	0	0	0	0	1	0	1	0	0	0
		Cattle	HACCP Cecal (Beef)	6	3	2	2	2	4	5	0	1	0	1	1 0 0
		ine	Cecal (Dairy)  Retail Pork Chops  HACCP <sup>1</sup>	0	0	0	0	0	0	0	0	0	0	0	0
	Autiminulain	Swine	Cecal (Market Hogs) Cecal (Sows)												0 1
	Antimicrobial (Resistance Breakpoint)		Isolate Source												
Macrolides	Azithromycin (MIC ≥32 μg/mI)		Humans										0.0% 0	0.0%	0.0% 0
		SU	Retail Chickens										0.0%	0.0%	0.0%
		Chickens	HACCP										0.0%	0.0%	0.0%
		Ö	Cecal												0.0%
		"	Retail Ground Turkey										0.0%	0.0%	0.0%
		Turkeys	HACCP											0.0%	0.0%
		l <sub>2</sub>	Cecal												0.0%
			Retail Ground Beef												U
			HACCP											0.0%	0.0%
		Cattle	Cecal (Beef)											0	0
			Cecal (Dairy)												
			Retail Pork Chops												
		Swine	HACCP												
		S	Cecal (Market Hogs)												0.0%
D	A : -: !!!:-		Cecal (Sows)	0.004	0.00/	4.407	0.004	4.607	0.404	4.404	0.00/	0.00/	E 40/	4.40/	0
	Ampicillin (MIC ≥ 32 μg/ml)		Humans	6.8%	2.3%	4.1% 11	2.6%	4.1% 17	2.1%	4.1% 18	3.9% 16	2.3%	5.1% 20	4.1% 15	5.8% 22
		SL	Retail Chickens	0.0% 0	66.7% 2	33.3% 1	0.0% 0	17.6% 3	0.0%	6.7% 2	18.5% 5	0.0% 0	9.5% 2	0.0% 0	0.0%
		Chickens	HACCP	4.2% 2	0.0% 0	1.2% 1	1.2% 2	1.6% 3	1.6% 2	2.6% 3	2.5% 3	2.6% 4	1.5% 2	2.5% 5	3.8% 3
		ò	Cecal												0.0%
			Retail Ground Turkey	0.0%	0.0%					0.0%			0.0%	0.0%	50.0%
		Turkeys	HACCP	0	0			0.0%		0.0%		0.0%	0	0.0%	0.0%
		Ţ	Cecal					0		0		0		0	0.0%
			Retail Ground Beef	0.0%	0.0%					0.0%		0.0%			0
				0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%		0		0.0%	0.0%
		Cattle	HACCP	0.0%	0.0%	0.0%	0.0%	1	0.0%	0.0%		1		0.0%	0.0%
		Ö	Cecal (Beef)												
			Cecal (Dairy)												
			Retail Pork Chops												
		ne	HACCP	0.0%	0.0% 0	0.0% 0			0.0%						
		Swine	Cecal (Market Hogs)	Ť	Ť	Ť									
			Cecal (Sows)												0.0%
	Chloramphenicol	+	Humans	0.3%	0.4%	0.4%	0.5%	0.0%	0.5%	0.5%	0.0%	0.6%	0.0%	0.5%	0.3%
	(MIC ≥ 32 μg/mI)		Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3 0.0%	0.0%	0.0%	0.0%
		sue		0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	1.3%	0.0%	0.0%	0.0%
		Chickens	HACCP	0.070	0	0.070	1	0.070	0.070	0.070	0.070	2	0.070	0.070	0.0%
		Ľ	Cecal	0.004	0.004					0.001			0.001	0.001	0
		s/	Retail Ground Turkey	0.0% 0	0.0% 0					0.0%			0.0% 0	0.0%	0.0%
		Turkeys	HACCP					0.0% 0		0.0% 0		0.0% 0		0.0%	0.0%
	F e e e e e e e e e e e e e e e e e e e	Cecal												0.0%	
		Retail Ground Beef	0.0%	0.0%					0.0%		0.0%				
		HACCP	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%		100.0%		0.0%	0.0%	
		Cecal (Beef)	0	0	0	0	1	0	0		1		0	0	
			Cecal (Dairy)												
		1	Retail Pork Chops												
				0.007	0.007										
		ine	HACCP	0.0% 0	0.0% 0	0.0% 0			0.0% 0						
		Swine	HACCP Cecal (Market Hogs)												0.0%

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Year	obial Resistance am	nong -	Saimonella Enteriti	2002	2003	2013	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	sted		Humans	337	257	271	384	412	385	442	410	513	391	364	382
		Chickens	Retail Chickens HACCP	8 48	3 42	3 84	12 173	17 188	13 124	30 116	27 118	28 152	21 134	26 203	25 79 6
		urkeys	Retail Ground Turkey HACCP	5 0	1 0	0	0	0	0	2	0	0	1 0	4	2
		Cattle	Retail Ground Beef HACCP	1	1 3	0 2	0 2	0 2	0 4	1 5	0	1	0	0	0 1
		2	Cecal (Beef) Cecal (Dairy)												0
		Swine	Retail Pork Chops HACCP <sup>1</sup> Cecal (Market Hogs) Cecal (Sows)	0 1	0 1	1	0	0	1	0	0	0	0	0	0 0 1
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class Quinolones	Breakpoint) Ciprofloxacin		Source Humans	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%
	(MIC ≥ 1 μg/ml)	-	Retail Chickens	0.0%	0.0%	1 0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1 0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chic	Cecal	0	0	0	0	0	0	0	0	0	0	0	0.0%
			Retail Ground Turkey	0.0%	0.0%					0.0%			0.0%	0.0%	0.0%
		Turkeys	HACCP	0	0			0.0%		0.0%		0.0%	0	0.0%	0.0%
		ī	Cecal					0		0		0		0	0.0%
			Retail Ground Beef	0.0%	0.0%					0.0%		0.0%			0
		<u>0</u>	HACCP	0.0% 0	0.0% 0	0.0%	0.0%	0.0%	0.0%	0 0.0% 0		0 0.0% 0		0.0%	0.0%
		Cattle	Cecal (Beef)	0		0	0	0	0	0		0		0	0
			Cecal (Dairy)												
			Retail Chickens												
		ne.	HACCP	0.0%	0.0%	0.0% 0			0.0%						
		Swine	Cecal (Market Hogs)			-			-						
			Cecal (Sows)												0.0%
	Nalidixic Acid (MIC ≥ 32 µg/mI)		Humans	3.9% 13	4.7% 12	6.6% 18	4.7% 18	7.0% 29	5.7% 22	7.2% 32	3.7% 15	5.3% 27	7.2% 28	7.7% 28	5.8% 22
		SL	Retail Chickens	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0% 0	3.7% 1	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	0.0%	0.0% 0	0.0% 0	0.6% 1	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0%	0.0%	0.0%	0.0%
		0	Cecal												0.0% 0
		s/s	Retail Ground Turkey	0.0%	0.0% 0					0.0%			0.0%	0.0%	0.0%
		Turkeys	HACCP					0.0% 0		0.0% 0		0.0% 0		0.0%	0.0%
		Ĺ	Cecal	0.00/	0.004					0.00/		0.00/			0.0%
			Retail Ground Beef	0.0%	0.0%	0.00/	0.00/	0.00/	0.00/	0.0%		0.0%		0.00/	0.00/
		Cattle	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%		0.0%	0.0%
		0	Cecal (Beef)												
			Cecal (Dairy)												
			Retail Pork Chops	0.0%	0.0%	0.0%			0.0%						
		Swine	HACCP	0.070	0	0.070			0						
		0)	Cecal (Market Hogs)												0.0%
Tetracyclines	Tetracycline		Cecal (Sows)	4.2%	1.6%	3.3%	2.3%	1.7%	3.9%	1.8%	1.2%	2.1%	1.8%	3.6%	0 4.5%
. on adjoining	(MIC ≥ 16 μg/mI)	_	Retail Chickens	14	4 0.0%	9 33.3%	9	7 11.8%	15 0.0%	3.3%	5 3.7%	11	7 19.1%	13	17
		kens	HACCP	0 2.1%	0 2.4%	1 2.4%	0.6%	2 1.6%	0 2.4%	1 0.9%	1 2.5%	0 3.3%	4 0.7%	0 1.5%	0 2.5%
		Chickens	Cecal	1	1	2	1	3	3	1	3	5	1	3	0.0%
			Retail Ground Turkey	0.0%	0.0%					50.0%			0.0%	25.0%	0 50.0%
		keys	HACCP	0	0			0.0%		0.0%		0.0%	0	0.0%	0.0%
		T <sub>D</sub>	Cecal					0		0		0		0	0.0%
			Retail Ground Beef	0.0%	0.0%					0.0%		0.0%			0
			HACCP	0.0%	0.0%	0.0%	0.0%	50.0%	25.0%	0.0%		100.0%		0.0%	0.0%
		Cattle	Cecal (Beef)	0	0	0	0	1	1	0		1		0	0
			Cecal (Dairy)												
		$\vdash$	Retail Pork Chops												
		60	HACCP	0.0%	0.0%	0.0%			0.0%						
		Swine	Cecal (Market Hogs)	0	0	0			0						
			Cecal (Sows)												0.0%
1, 2010 , 10010 F010		′ 0	Imonella because in prio	r unara tha	norecent of r			iti f C	-/						0

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 47a. Resistance Patterns among Salmonella Enteritidis Isolates, 2002-2013<sup>1</sup>

Year Number of Isolates Tested		Humans	<b>2002</b> 337	<b>2003</b> 257	<b>2004</b> 271	<b>2005</b> 384	<b>2006</b> 412	<b>2007</b> 385	<b>2008</b> 442	<b>2009</b> 410	<b>2010</b> 513	<b>2011</b> 391	<b>2012</b> 364	<b>2013</b> 382
3300	Chickens	Retail Chickens HACCP Cecal	8 48	3 42	3 84	12 173	17 188	13 124	30 116	27 118	28 152	21 134	26 203	25 79 6
	Turkeys	Retail Ground Turkey HACCP Cecal	5 0	1 0	0	0	0	0	2	0	0	1	4 1	2 1 1
	Cattle	Retail Ground Beef HACCP Cecal (Beef) Cecal (Dairy)	1 6	1 3	0 2	0 2	0 2	0 4	1 5	0	1	0	0 1	0 1 0
	Swine	Retail Pork Chops HACCP <sup>2</sup> Cecal (Market Hogs)	0 1	0 1	0	0	0	0	0	0	0	0	0	0
Resistance Pattern		Cecal (Sows) Source												1
No Resistance Detected		Humans	87.5% 295	91.8% 236	86.7% 235	91.4% 351	88.8% 366	90.4% 348	87.3% 386	92.0% 377	92.0% 472	88.0% 344	88.2% 321	87.49 334
		Retail Chickens	100.0%	33.3%	66.7%	100.0%	82.4% 14	100.0%	90.0% 27	74.1% 20	92.9% 26	81.0% 17	100.0%	100.0°
	Chickens	HACCP	95.8%	97.6%	97.6%	97.1%	97.9%	96.0%	97.4%	96.6%	95.4%	97.8%	96.1%	96.29
	Š	Cecal	46	41	82	168	184	119	113	114	145	131	195	76 100.0
	_	Retail Ground Turkey	100.0%	100.0%					50.0%			100.0%	75.0%	50.09
	eys	-	5	1			100.0%		1 100.0%		100.0%	1	3 100.0%	100.0
	Turkeys	HACCP					3		1		1		1	100.0
		Cecal	100.00/	100.00/					100.00/		100.00/			1
		Retail Ground Beef	100.0% 1	100.0% 1					100.0% 1		100.0% 1			
	Cattle	HACCP	100.0% 6	100.0% 3	100.0% 2	100.0% 2	50.0% 1	75.0% 3	100.0% 1		0.0% 0		100.0% 1	100.0 1
	ర	Cecal (Beef)												
		Cecal (Dairy)												
		Retail Pork Chops												
		HACCP	100.0%	100.0%	100.0%			100.0%						
	Swine	Cecal (Market Hogs)	1	1	1			1						
														100.0
		Cecal (Sows)				1.00			. ==:					1
2. Resistant to ≥ 3		Humans	2.1% 7	0.4% 1	1.1% 3	1.3% 5	1.7% 7	1.0% 4	0.7% 3	1.0% 4	2.1% 11	2.3% 9	2.7% 10	1.6% 6
Antimicrobial Classes	Sc	Retail Chickens	0.0% 0	33.3% 1	33.3% 1	0.0%	0.0%	0.0%	3.3% 1	3.7% 1	0.0%	9.5% 2	0.0%	0.09
	Chickens	HACCP	4.2% 2	0.0%	2.4%	0.6% 1	0.0%	0.0%	0.9% 1	0.8% 1	2.6%	0.7% 1	0.5% 1	2.5%
	0	Cecal												0.0%
		Retail Ground Turkey	0.0%	0.0%					0.0% 0			0.0%	0.0% 0	0.0%
	Turkeys	HACCP		Ü			0.0%		0.0%		0.0%		0.0%	0.0%
	2	Cecal					0		0		0		0	0.09
	_	Retail Ground Beef	0.0%	0.0%					0.0%		0.0%			0
		HACCP	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%		0 100.0%		0.0%	0.09
	Cattle		0	0	0	0	1	0	0		1		0	0
		Cecal (Beef)												
		Cecal (Dairy)												
		Retail Pork Chops												
	e.	HACCP	0.0%	0.0%	0.0%			0.0%						
	Swine	Cecal (Market Hogs)												
		Cecal (Sows)												0.0%
		Humans	0.6%	0.4%	0.7%	1.0%	0.7%	0.3%	0.2%	0.5%	0.4%	1.3%	1.6%	1.6%
3. Resistant to ≥ 4 Antimicrobial Classes	_	Retail Chickens	0.0%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	3.7%	0.0%	5 9.5%	0.0%	0.09
	ens		0 4.2%	0.0%	1.2%	0.0%	0.0%	0.0%	0.9%	0.8%	0	0.0%	0.0%	1.39
	Chickens	HACCP	2	0	1	0	0	0	1	1	1	0	0	1
		Cecal												0.09
	ru.	Retail Ground Turkey	0.0%	0.0%					0.0%			0.0%	0.0% 0	0.0%
	Turkeys	HACCP					0.0%		0.0%		0.0%		0.0%	0.0%
	-	Cecal												0.09
		Retail Ground Beef	0.0%	0.0%					0.0%		0.0%			Ť
	9	HACCP	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%		100.0%		0.0%	0.09
	Cattle	Cecal (Beef)	U		U	U		U	U				U	U
		Cecal (Dairy)												
	$\vdash$	Retail Pork Chops												
			0.0%	0.0%	0.0%			0.0%						
	Swine	HACCP	0.070	0.070	0.070			0.070						
	Ó	Cecal (Market Hogs)												
														0.09

<sup>&</sup>lt;sup>1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

<sup>&</sup>lt;sup>2</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

March Designer   1	Table 47b. Resistance Patte			2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Second	Number of Isolates Tested	H					384		385	442	410			364	382
Second		Chickens	HACCP												79
Marie Count has   1			Retail Ground Turkey HACCP												2 1
March Park Colors		attle	HACCP												1
		0	Cecal (Dairy)	0	0	0	0	0	0	0	0	0	0	0	0
Name Part   Name   Na		Swine	HACCP <sup>2</sup> Cecal (Market Hogs)												0
Resident to \$ 6 million (Charles)  Registrate to \$ 6 million (Charles)  Registrate (Char	Resistance Pattern		Source	0.09/	0.49/	0.79/	0.69/	0.29/	0.29/	0.0%	0.29/	0.09/	0.6%	0.69/	0.29/
March   Marc	4. Resistant to ≥ 5		Humans	0	1	2	2	1	1	0	1	0	2	2	1
Cocid   Coci	Antimicrobial Classes	us	Retail Chickens	0	0	1	0	0	0	0	1	0	0	0	0
Cocid   Coci		hicke	HACCP												
Read Columb Tubey   0.0%   0		0	Cecal												
Modern			Retail Ground Turkey												0.0%
Cocal   Coca		keys	HACCP	U	U					0.0%			0	0.0%	0.0%
Company   Comp		Į						0		0		0		0	
Medical Control Control   0   0   0   0   0   0   0   0   0		$\vdash$		0.0%	0.0%					0.0%		0.0%			
No. Control (Control (Contro				0	0	0.004	0.007	E0.004	0.001	0		0		0.004	0.001
Cocid (Bred)		attle	HACCP												
Retail Fork Chops		ď	Cecal (Beef)												
HACCP			Cecal (Dairy)												
Cocid (Sovie)   Cocid (Sovie			Retail Pork Chops												
Form   Control (Market Hopps)		_	HACCP	0.0%		0.0%									
Cocal (Sowe)		Swine		0	0	0			0						
Least ACTS 4 Resistant															0.0%
A			Cecal (Sows)	0.00/	0.40/	0.40/	0.50/	0.00/	0.00/	0.00/	0.00/	0.00/	2.00/	2.20/	0
MACCP	5. At Least ACSSuT <sup>3</sup> Resistant		Humans	0	1	1	2	0	1	0	0	0	0	0	1
Retail Ground Turkey		SI	Retail Chickens												
Cecal   Ceca		nicker	HACCP												
Refail Ground Turkey		ō	Cecal												0.0%
MACCP		_	Retail Ground Turkey												0.0%
Cocal   Retail Ground Beel		keys	HACCP	0	0			0.0%				0.0%	0		
Retail Ground Beet		Ţ						0		0		0		0	
National Statute Beel   0   0   0   0   0   0   0   0   0		_		0.0%	0.0%					0.0%		0.0%			0
Part   Care				0	0	0.0%	0.0%	50.0%	0.0%	0		0		0.0%	0.0%
Cacal (Dairy)   Cacal (Dairy)   Cacal (Dairy)   Cacal (Dairy)   Cacal (Dairy)   Cacal (Dairy)   Cacal (Market Hogs)   Cacal (Sows)   Cacal (Sows)   Cacal (Market Hogs)   Caca		attle													
Retail Pork Chops		Ü	Cecal (Beef)												
HACCP 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0			Cecal (Dairy)												
Cecal (Market Hogs)   Cecal (Sows)			Retail Pork Chops												
Cecal (Sows)   Ceca		ine	HACCP												
Humans		Sw	Cecal (Market Hogs)												
Humans 0.0% 0.4% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0%			Cecal (Sows)												
Retail Chickens	6 At Least ACT/S 4 Decisions		Humans												0.0%
HACCP	o. At Least ACT/S Resistant	-	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Retail Ground Turkey		kens		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Retail Ground Turkey 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0		Chi		0	0	0	0	0	0	0	0	0	0	0	0.0%
Retail Ground Beef		$\vdash$	-	0.0%	0.0%					0.0%			0.0%	0.0%	
Cecal		eys		0	0			0.0%				0.0%	0		
Retail Ground Beef 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0		Ę													0
Retail Stutin Seel 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		<u> </u>	-	0.0%	0.0%					0.0%		0.0%			
TACCP				0	0	0.0%	0.0%	0.0%	0.0%	0		0		0.0%	0.0%
Cecal (Dairy)  Retail Pork Chops  UACOR 0.0% 0.0% 0.0% 0.0%		attle													
Retail Pork Chops 0.0% 0.0% 0.0% 0.0%		0	Cecal (Beef)												
UACOD 0.0% 0.0% 0.0% 0.0%			Cecal (Dairy)												
HACCP 0.0% 0.0% 0.0% 0.0%			Retail Pork Chops												
		e i.	HACCP												
		Swii	Cecal (Market Hogs)												
Cecal (Sows)			Cecal (Sows)												
arting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial	Starting in 2011, testing included a	nine ar		n the addition	n of the mad	rolide azithro	omycin. Beca	ause resistar	nce to azithro	omycin is low	(in this case	e, <1%), anti	microbial		U

<sup>1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

<sup>2</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

<sup>3</sup> ACSSUT = ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline

<sup>4</sup> ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole

Table 47c. Resistance Patterns among Salmonella Enteritidis Isolates, 2002-2013

Year			2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	337	257	271	384	412	385	442	410	513	391	364	382
	ens	Retail Chickens	8	3	3	12	17	13	30	27	28	21	26	25
	Chickens	HACCP Cecal	48	42	84	173	188	124	116	118	152	134	203	79 6
		Retail Ground Turkey	5	1	0	0	0	0	2	0	0	1	4	2
	Turkeys	HACCP	0	0	0	0	3	0	1	0	1	0	1	1
	2	Cecal												1
		Retail Ground Beef	1	1	0	0	0	0	1	0	1	0	0	0
	Cattle	HACCP Cecal (Beef)	6	3	2	2	2	4	5	0	1	0	1	1 0
		Cecal (Dairy)												0
		Retail Pork Chops	0	0	0	0	0	0	0	0	0	0	0	0
	Swine	HACCP <sup>1</sup>	1	1	1	0	0	1	0	0	0	0		
	l o	Cecal (Market Hogs) Cecal (Sows)												0
Resistance Pattern		Source												
7. At Least ACSSuTAuCx 2		Humans	0.0%	0.0%	0.0%	0.3%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Resistant		Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	
	Ę		0	0	0	0	0	0	0	0	0	0		0.0%
	_	Cecal	0.0%	0.0%					0.0%			0.0%	0.0%	0.0%
	s,	Retail Ground Turkey	0.0%	0.0 %					0			0.0 %	0	0
	Turkeys	HACCP					0.0%		0.0%		0.0%		0.0%	0.0%
	-	Cecal												0.0%
		Retail Ground Beef	0.0%	0.0%					0.0%		0.0%			0
			0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%		0.0%		0.0%	0.0%
	Cattle	HACCP	0	0	0	0	1	0	0		0		0	0
		Cecal (Beef)												
		Cecal (Dairy)												
		Retail Pork Chops												
		HACCP	0.0%	0.0%	0.0%			0.0%						
	Swine		0	0	0			0						
	0,	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0
8. At Least Ceftriaxone and		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.3%
Nalidixic Acid Resistant		Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chic		0	0	0	0	0	0	0	0	0	0	0	0.0%
		Cecal												0
	s	Retail Ground Turkey	0.0%	0.0%					0.0%			0.0%	0.0%	0.0%
	Turkeys	HACCP					0.0%		0.0%		0.0%		0.0%	0.0%
	F	Cecal					Ü							0.0%
		Retail Ground Beef	0.0%	0.0%					0.0%		0.0%			0
			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%		0.0%	0.0%
	Cattle	HACCP	0.076	0.070	0.070	0.076	0.076	0.070	0.076		0.076		0.076	0.070
	O	Cecal (Beef)												
		Cecal (Dairy)												
		Retail Pork Chops												
		HACCP	0.0%	0.0%	0.0%	0.0%			0.0%					
	Swine		0	0	0	0			0					
	S	Cecal (Market Hogs)												
		Cecal (Sows)												0.0%

Cecal (Sows)

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low <sup>2</sup> ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

Table 48a. Antimicrobial Resistance among Salmonella Typhimurium Isolates, 2002-2013

Number of Number	Table 48a. Antimicr	obiai Resistance an	nong .	Saimonena Typnim	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Second processor   Second proc		sted	T	Humans												325
Restauration flower   2			Chickens	HACCP												68 55 15
## MOCCE   10				Retail Ground Turkey												15 1 5
Cocci   Desire   France   Fr				Retail Ground Beef												0
### Antomicrobial Class   Cocco (Chiefe House)   Act   270   93   42   250   44   150   20   13   5			Catt	Cecal (Beef)	98	78	48	34	22	26	28	18	15	14	16	23 14 21
### Annion Colors   Properties   Properties			Swine	HACCP <sup>1</sup> Cecal (Market Hogs)											6	4 21 4
Management   Man		(Resistance														
Monta S To (symbol)		Gentamicin		•												1.2%
MACCP   19		(MIC ≥ 16 μg/ml)		ı	0.0%	0.0%	2.0%	0.0%	0.0%	0.0%	1.5%	2.5%	6.3%	3.0%	6.8%	4.4%
Read Closed   Control Turkey   Control   Control Turkey   Control Turkey   Control   Control Turkey   Cont			ckens		12.7%	5.1%	4.1%	4.4%	6.7%	3.6%	5.7%	0.0%	5.6%	6.7%	3.8%	3.6%
Montropin   Mont			Ş		19	8	7	8	7	3	4	0	3	2	4	0.0%
MACCP				Retail Ground Turkey												0.0%
Real Ground Search Real Drun Chippia Real Ground Search Real Brun Chippia Real Ground Search Real Brun Chippia Real Ground Search Real Ground Search Real Brun Chippia Real Real Real Real Re			keys	-	44.4%	83.3%	64.3%	14.3%		16.7%	33.3%	50.0%	0.0%	0.0%	25.0%	20.0%
Result Ground teled 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			ī		4	5	9	1	1	1	1	1	0	0	1	50.0%
HACCP   2.0%   1.3%   0.0%			-													1
Cocal (Bows)					2.0%				0.0%	7.7%	0.0%					0.0%
Related Checkers			Cattle		2	1	0	0	0	2	0	0	0	0	1	0.0%
Real Pork Chops   0.0%																0.0%
## MACCP   2.3%   0.0%   3.3%   7.3%   0.0%   2.3%   10.0%   0.0%   7.7%   0.0%					0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Retail Closurd Turkey			Swine		0		0	0	1	0	0	0	0		0	0
Name   Consol (Bowns)																9.5%
Retail Chickens   7,8%   7,1%   5,8%   5,7%   5,1%   5,8%   2,5%   4,9%   7,2%   4,0%   2,0%   0   0   0   0   0   0   0   0   0																2 0.0%
(MIC ≥ 64 µg/ml)    Post   Control		Kanamycin		, ,	7.6%	7 1%	5.8%	5.7%	5.1%	5.0%	2.5%	4 9%	7 2%	4.0%	2.0%	0.3%
Cocal (Carlor)   Coca		(MIC ≥ 64 μg/ml)		1	30	29	22	25	21	24	10	18	26	13	6	1 25.0%
Retail Ground Turkey			sue		0	4	17	7	10	3	17	34	8	16	9	17 3.6%
Retail Ground Turkey			Chick													2 0.0%
Streptomycin					0.09/	E0.09/	E0.00/	0.09/		0.09/	0.00/	0.00/	0.09/	0.00/	11 10/	0.0%
Retail Ground Basef   0.0%			ys	Retail Ground Turkey	0	1	1	0	0.00/	0	0	0	0	0	1	0
Retail Ground Basef   0.0%			Turke	HACCP												20.0%
Nedar Storich Beet   0			_	Cecal	0.00/	0.00/			0.00/	0.00/	0.00/				0.00/	50.0% 1
Cacal (Beer)   Caca				Retail Ground Beef	0	0			0	0	0				0	
Cecal (Clairy)   Retail Pork Chops   0.0%   0.0			attle	HACCP												8.7% 2
Retail Pork Chops 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0			ő	Cecal (Beef)												14.3% 2
Retail Pork Chops				Cecal (Dairy)												0.0%
Streptomycin (MIC ≥ 64 µg/ml)   Humans   32.0%   35.7%   31.9%   28.1%   29.4%   32.3%   28.5%   25.9%   25.6%   25.7%   24.0%   26.1%   26.1%   27.1%   27.1%   27.1%   27.1%   27.1%   27.2%   28.1%   27.2%   27.1%   27.2%   28.				Retail Pork Chops	0	0	0	0	2	0	0	0	2	0		0.0%
Streptomycin (MIC ≥ 64 μg/ml)   Humans   32.0%   35.7%   31.9%   28.1%   29.4%   32.3%   28.5%   25.9%   25.6%   25.7%   24.0%   22.0%   22.0%   22.0%   22.0%   22.0%   22.0%   22.0%   22.0%   22.0%   22.0%   22.0%   22.0%   22.0%   22.0%   22.0%   24.0%   22.0%   22.0%   24.2%   24.2%   14.8%   4.4%   4.7%   1   2   7   11   19   18   16   13   13   16   13   14   18   16   13   18   18   16   13   18   18   16   13   18   18   16   13   18   18   18   18   18   18   18			ine	HACCP												
Streptomycin (MIC ≥ 64 µg/ml)			Sw	Cecal (Market Hogs)												14.3% 3
MIC ≥ 64 μg/ml)   126   146   122   123   120   131   113   96   92   83   71				Cecal (Sows)												25.0% 1
Retail Chickens 0.0% 18.2% 14.3% 3.5% 9.5% 28.0% 16.2% 15.6% 22.8% 24.2% 14.8% 4 7 1 2 7 11 19 18 16 13 13 14 13 8 8 18 19 4 2 7 11 19 18 16 13 13 14 15 18 16 13 13 14 15 18 18 16 13 18 18 18 18 18 18 18 18 18 18 18 18 18		Streptomycin (MIC ≥ 64 µg/mI)		Humans	126	146	122	123	120	131	113	96	92	83	71	20.6% 67
HACCP 30.0% 45 26 14 25 18 9 4 5.7% 5.6% 14.8% 6.7% 8.6% 5.6% 15.7% 18.10.8% 5.7% 5.6% 14.8% 6.7% 8.6% 5.6% 15.7% 18.10.8% 5.7% 5.6% 14.8% 6.7% 8.6% 5.6% 15.7% 18.10.9% 10.0%			õ	Retail Chickens	0.0%	18.2%	14.3%	3.5%	9.5%	28.0%	16.2%	15.6%	22.8%	24.2%	14.8%	4.4%
Retail Ground Turkey			icken	HACCP	30.0%	16.7%	8.2%	13.7%	17.1%	10.8%	5.7%	5.6%	14.8%	6.7%	8.6%	5.5%
Retail Ground Turkey 0.0% 50.0% 1.00% 0.0% 100.0% 0.0% 0.0% 33.3% 50.0% 55.6% 10 10 0.0% 100.0% 0.0% 33.3% 50.0% 55.6% 10 10 0.0% 100.0% 57.1% 60.0% 57.1% 60.0% 50.0% 33.3% 100.0% 50.0% 0.0% 25.0% 2			5	Cecal	75	20	17	20		Ť					Ť	0.0%
HACCP 77.9% 100.0% 64.3% 57.1% 60.0% 50.0% 33.3% 100.0% 50.0% 0.0% 25.0% 26.0% 3 3 3 1 2 2 0 0 1 50.0% 100.0% 25.0% 26.0% 26.0% 26.0% 26.0% 27.2% 26.0% 27.2% 27.0% 27.2				Retail Ground Turkey												100.0%
Retail Ground Beef			rkeys	HACCP	77.8%	100.0%	64.3%	57.1%		50.0%	33.3%	100.0%	50.0%	0.0%	25.0%	20.0%
Retail Ground Beef 0.0% 0.0% 100.0% 100.0% 100.0% 1 00.0% 50.0% 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			Ţ			Ö	9	4	3	3				U		50.0%
HACCP   66.3%   52.6%   56.3%   55.9%   54.5%   50.0%   72.2%   53.3%   57.1%   50.0%   35.0%   50.0%   72.2%   53.3%   57.1%   50.0%   35.0%   72.2%   53.3%   57.1%   50.0%   35.0%   72.2%   53.3%   57.1%   50.0%   35.0%   72.2			$\vdash$													1
Cecal (Beef) Cecal (Cairy)  Retail Pork Chops 1 1 2 19 12 13 14 13 8 8 8 8 5 5 5 6 6 6 6 6 6 7 7 1 1 1 1 2 2 2 2 0 0 1 1 1 4 4 5 3 3 7 16 4 1 29 18 26 8 16 8 4 6 8 4 6 8 16 8 4 1 10 10 10 10 10 10 10 10 10 10 10 10 1					66.3%	52.6%			54.5%	50.0%	50.0%				50.0%	39.1%
Cecal (Dairy)  Retail Pork Chops   50.0%   100.0%   100.0%   100.0%   100.0%   33.3%   100.0%   80.0%   71.4%   50.0%   70.0%   70.0%   70.0%   70.0%   59.1%   80.0%   80.0%   61.5%   80.0%   80.0%   61.5%   80.0%   80.0%   61.5%   80.0%   80.0%   61.5%   80.0%   80.0%   61.5%   80.0%			Cattle		65	41	27	19	12	13	14	13	8	8	8	9 57.1%
Retail Pork Chops																8 66.7%
HACCP   1.1   2   2   2   0   1   1   4   5   3			$\vdash$		50.0%	100.0%	100.0%	100.0%	100.0%	0.0%	33.3%	100.0%	80.0%	71.4%	50.0%	14 70.0%
HACCF   37   16   41   29   18   26   8   16   8   4					1	1	2	2	2	0	1	1	4	5		3
Caral (Sours) 10			wine													57.1%
			S													12 100.0%
1 In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low				1 1												100.0% 4

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 48b. Antimicrobial Resistance among Salmonella Typhimurium Isolates, 2002-2013

Table 48b. Antimicro	bial Resistance amo	ong .	Salmonella Typhim	urium Isc	plates, 20 2003	02-2013 2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ed		Humans	394	409	382	438	408	405	396	370	359	323	296	325
		cens	Retail Chickens	9	22	49	29	21	25	68	122	79	66	88	68
		Chickens	HACCP Cecal	150	156	171	183	105	83	70	36	54	30	105	55 15
		_	Retail Ground Turkey	2	2	2	1	0	1	1	1	6	8	9	1
		Turkeys	HACCP	9	6	14	7	5	6	3	2	4	2	4	5
		_	Cecal												2
		e e	Retail Ground Beef HACCP	2 98	1 78	0 48	0 34	1 22	3 26	2 28	0 18	0 15	0 14	1 16	0 23
		Cattle	Cecal (Beef)	90	70	40	34	22	20	20	10	15	14	10	14
			Cecal (Dairy)												21
		e	Retail Pork Chops HACCP <sup>1</sup>	2 48	1 27	2 53	2 42	2 25	3 44	3 10	1 20	5 13	7 5	6	4
		Swine	Cecal (Market Hogs)	40	21	55	42	25	44	10	20	13	5		21
	Antimicrobial		Cecal (Sows)												4
	(Resistance		Isolate												
Antimicrobial Class β-Lactam/β-Lactamase	Breakpoint) Amoxicillin-	1	Source	7.6%	5.9%	4.7%	3.2%	4.4%	6.7%	3.5%	6.2%	4.2%	7.1%	5.7%	3.4%
Inhibitor Combinations	Clavulanic Acid (MIC ≥ 32 / 16 µg/ml)		Humans	30 33.3%	24 63.6%	18 49.0%	14 51.7%	18 57.1%	27 44.0%	14 48.5%	23 57.4%	15 60.8%	23 54.6%	17 55.7%	11 50.0%
	(o = 02 / 10 pg/)	sue	Retail Chickens	3 28.7%	14 25.6%	24	15	12	11	33	70	48	36 6.7%	49	34
		Chickens	HACCP	43	40	43.3% 74	19.7% 36	30.5% 32	33.7% 28	24.3% 17	33.3% 12	29.6% 16	2	29.5% 31	9.1% 5
		0	Cecal												13.3% 2
		s	Retail Ground Turkey	0.0%	100.0%	0.0%	100.0%		0.0%	0.0%	0.0%	50.0% 3	62.5% 5	22.2%	0.0%
		Turkeys	HACCP	22.2%	16.7% 1	14.3% 2	0.0%	0.0%	16.7% 1	0.0%	50.0% 1	50.0%	0.0%	50.0% 2	0.0%
		Ţ	Cecal				U	U	'	U	'		U		0.0%
		$\vdash$	Retail Ground Beef	0.0%	0.0%			0.0%	0.0%	0.0%				0.0%	0
				0 17.3%	0 20.5%	25.0%	35.3%	0 27.3%	0 26.9%	0 21.4%	27.8%	20.0%	35.7%	0 12.5%	30.4%
		Cattle	HACCP	17	16	12	12	6	7	6	5	3	5	2	7 21.4%
		0	Cecal (Beef)												3
			Cecal (Dairy)												52.4% 11
			Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
		e	HACCP	8.3% 4	0.0%	0.0%	9.5% 4	0.0%	2.3% 1	0.0% 0	0.0% 0	7.7% 1	0.0% 0		
		Swine	Cecal (Market Hogs)		<u> </u>										0.0%
			Cecal (Sows)												0.0%
Cephems	Cefoxitin		Humans	4.3%	4.6%	4.7%	2.5%	3.9%	5.7%	3.5%	5.4%	3.3%	6.8%	5.4%	3.4%
	(MIC ≥ 32 μg/ml)			17 33.3%	19 63.6%	18 49.0%	11 51.7%	16 52.4%	23 40.0%	14 45.6%	20 47.5%	12 51.9%	22 34.9%	16 45.5%	11 44.1%
		ens	Retail Chickens	3 26.7%	14 23.7%	24 43.3%	15 19.7%	11 29.5%	10 24.1%	31 20.0%	58 27.8%	41 27.8%	23 6.7%	40 18.1%	30 3.6%
		Chickens	HACCP	40	37	74	36	31	20	14	10	15	2	19	2
			Cecal												6.7% 1
		s	Retail Ground Turkey	0.0%	100.0%	0.0%	100.0% 1		0.0%	0.0%	0.0%	50.0% 3	50.0% 4	22.2% 2	0.0%
		Turkeys	HACCP	22.2% 2	16.7% 1	14.3% 2	0.0%	0.0%	16.7% 1	0.0%	50.0% 1	0.0%	0.0%	50.0% 2	0.0%
		F	Cecal											_	0.0%
			Retail Ground Beef	0.0%	0.0%			0.0%	0.0%	0.0%				0.0%	0
			HACCP	11.2%	16.7%	25.0%	35.3%	0 27.3%	26.9%	0 17.9%	22.2%	20.0%	35.7%	0 12.5%	30.4%
		Sattle		11	13	12	12	6	7	5	4	3	5	2	7 21.4%
			Cecal (Beef)												3 52.4%
			Cecal (Dairy)	0.09/	0.0%	0.00/	0.0%	0.0%	0.09/	0.09/	0.09/	0.09/	0.09/	0.0%	11
			Retail Pork Chops	0.0%	0	0.0%	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Swine	HACCP	4.2% 2	3.7% 1	0.0%	4.8% 2	0.0%	4.5% 2	0.0% 0	0.0% 0	0.0% 0	0.0% 0		
		Š	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												
	Ceftiofur	İ	Humans	4.3%	5.1% 21	4.5%	2.5%	4.2%	6.4%	3.5%	6.5%	4.7%	6.8%	5.7%	3.4%
	(MIC ≥ 8 μg/mI)		Retail Chickens	33.3%	63.6%	49.0%	51.7%	17 57.1%	26 44.0%	14 48.5%	56.6%	17 60.8%	54.6%	17 55.7%	50.0%
		Chickens	HACCP	3 28.0%	14 25.6%	24 43.3%	15 19.7%	12 30.5%	11 32.5%	33 24.3%	69 33.3%	48 29.6%	36 6.7%	49 27.6%	9.1%
		Chic		42	40	74	36	32	27	17	12	16	2	29	5 13.3%
		<u> </u>	Cecal	0.0%	100.0%	0.0%	100.0%		0.0%	0.0%	0.0%	50.0%	50.0%	22.2%	0.0%
		3ys	Retail Ground Turkey	0 22.2%	16.7%	0 14.3%	1 0.0%	0.0%	0	0.0%	0 50.0%	3	4 0.0%	2 50.0%	0.0%
		Turkeys	HACCP	22.2%	16.7%	14.3%	0.0%	0.0%	16.7%	0.0%	1	0.0%	0.0%	2	0
		Ĺ	Cecal												0.0%
			Retail Ground Beef	0.0%	0.0%			0.0%	0.0%	0.0%				0.0%	
		후	HACCP	15.3% 15	20.5% 16	25.0% 12	35.3% 12	27.3% 6	26.9% 7	21.4% 6	27.8% 5	20.0%	35.7% 5	12.5% 2	30.4% 7
		Cattle	Cecal (Beef)	13	10			Ů		Ů	j	Ť	j		21.4%
			Cecal (Dairy)												52.4%
		$\vdash$	Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
				0 4.2%	0.0%	0 1.9%	0 4.8%	0.0%	0 2.3%	0.0%	0.0%	0.0%	0.0%	0	0
		Swine	HACCP	2	0.076	1.370	2	0.070	1	0.070	0.070	0.070	0.070		4.8%
		Ó	Cecal (Market Hogs)												1
		L	Cecal (Sows)												0.0% 0
1	P. L		Imonella because in prior												

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Year				2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Te	sted	S	Humans	394	409	382	438	408	405	396	370	359	323	296	325
		Chickens	Retail Chickens HACCP	9 150	22 156	49 171	29 183	21 105	25 83	68 70	122 36	79 54	66 30	88 105	68 55
		_	Cecal												15
		Turkeys	Retail Ground Turkey HACCP	2 9	2 6	2 14	7	0 5	1 6	1 3	1 2	6 4	8 2	9	1 5
		1	Cecal												2
		<u>e</u>	Retail Ground Beef	2 98	1 78	0 48	0 34	1 22	3 26	2 28	0 18	0 15	0 14	1 16	0 23
		Cattle	HACCP Cecal (Beef)	98	78	48	34	22	20	28	18	15	14	16	14
			Cecal (Dairy)												21
		ne	Retail Pork Chops HACCP <sup>1</sup>	2 48	1 27	2 53	2 42	2 25	3 44	3 10	1 20	5 13	7 5	6	4
		Swine	Cecal (Market Hogs)			00		20			20				21
	Antimicrobial		Cecal (Sows)												4
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
Cephems	Ceftriaxone		Humans	4.3% 17	5.1%	4.5% 17	2.5%	4.2% 17	6.4% 26	3.5%	6.5%	4.7% 17	6.8% 22	5.7% 17	3.4%
	(MIC ≥ 4 μg/mI)		Retail Chickens	33.3%	21 63.6%	49.0%	11 51.7%	57.1%	44.0%	14 48.5%	24 57.3%	60.8%	54.6%	55.7%	11 50.0%
		Chickens	HACCP	3 26.7%	14 25.6%	24 43.3%	15 19.7%	12 30.5%	11 33.7%	33 24.3%	70 33.3%	48 29.6%	36 6.7%	49 28.6%	9.1%
		Chic		40	40	74	36	32	28	17	12	16	2	30	5 13.3%
			Cecal	0.0%	100.0%	0.0%	100.0%		0.0%	0.0%	0.0%	50.0%	62.5%	22.2%	0.0%
		ys	Retail Ground Turkey	0	2	0	1		0	0	0	3	5	2	0
		Turkeys	HACCP	22.2% 2	16.7% 1	14.3% 2	0.0% 0	0.0% 0	16.7% 1	0.0% 0	50.0% 1	0.0%	0.0%	50.0% 2	0.0% 0
		Ľ	Cecal												0.0%
			Retail Ground Beef	0.0%	0.0% 0			0.0%	0.0%	0.0%				0.0%	
		Φ	HACCP	15.3%	20.5%	25.0%	35.3%	27.3%	26.9% 7	21.4%	27.8%	20.0%	35.7%	12.5%	30.4%
		Cattle	Cecal (Beef)	15	16	12	12	6		6	5	3	5	2	7 21.4%
			Cecal (Dairy)												52.4%
				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			Retail Pork Chops	0 4.2%	0.0%	0.0%	0 4.8%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0	0
		Swine	HACCP	2	0.070	0.076	2	0.078	1	0.078	0.076	0.078	0.0%		
		Ś	Cecal (Market Hogs)												4.8% 1
			Cecal (Sows)												0.0%
Folate Pathway Inhibit	Sulfamethoxazole/ Sulfisoxazole <sup>2</sup>		Humans	32.2% 127	38.9% 159	36.1% 138	32.0% 140	33.3% 136	37.3% 151	30.3% 120	30.0% 111	28.7% 103	27.2% 88	27.0% 80	20.9% 68
	(MIC ≥ 512 μg/ml)		Retail Chickens	44.4%	31.8%	73.5%	69.0%	90.5%	68.0%	94.1%	96.7%	92.4%	93.9%	89.8%	92.7%
		Chickens	HACCP	31.3%	7 28.2%	36 47.4%	20 37.2%	19 65.7%	17 60.2%	64 70.0%	118 52.8%	73 74.1%	70.0%	79 81.9%	63 76.4%
		Ŗ.	Cecal	47	44	81	68	69	50	49	19	40	21	86	93.3%
			Retail Ground Turkey	0.0%	50.0%	100.0%	0.0%		100.0%	0.0%	100.0%	66.7%	62.5%	55.6%	14 100.0%
		ske		0 77.8%	1 100.0%	2 78.6%	0 57.1%	80.0%	1 83.3%	0 66.7%	1 100.0%	4 50.0%	5 0.0%	5 75.0%	1 20.0%
		Turkeys	HACCP	7	6	11	4	4	5	2	2	2	0.070	3	1
			Cecal												50.0% 1
			Retail Ground Beef	0.0% 0	0.0% 0			100.0% 1	0.0% 0	50.0% 1				0.0% 0	
		Cattle	HACCP	58.2% 57	44.9% 35	60.4% 29	73.5% 25	59.1% 13	65.4% 17	53.6% 15	83.3% 15	60.0% 9	57.1% 8	62.5% 10	43.5% 10
		Ca	Cecal (Beef)												57.1% 8
			Cecal (Dairy)												66.7% 14
		F	Retail Pork Chops	50.0%	100.0%	100.0%	100.0%	100.0%	0.0%	33.3%	100.0%	80.0%	71.4%	50.0%	75.0%
			HACCP	68.8%	63.0%	81.1%	69.0%	96.0%	77.3%	80.0%	90.0%	4 69.2%	5 80.0%	3	3
		Swine	Cecal (Market Hogs)	33	17	43	29	24	34	8	18	9	4		71.4%
		"													15 100.0%
	Trimethoprim-	-	Cecal (Sows)	2.3%	3.4%	2.6%	2.7%	2.2%	2.5%	1.8%	3.0%	1.9%	1.9%	1.7%	1.2%
	Sulfamethoxazole		Humans	9	14	10	12	9	10	7	11	7	6	5	4
	(MIC ≥ 4 / 76 μg/ml)	SL	Retail Chickens	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	1.5% 1	0.0% 0	0.0%
		Chickens	HACCP	1.3% 2	0.6% 1	0.0%	0.0%	0.0%	0.0%	0.0%	2.8%	0.0%	0.0%	1.0% 1	0.0%
		Ö	Cecal												0.0%
			Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Ţ	Cecal	0	0	0	0	0	0	0	0	0	0	0	0.0%
		-		0.0%	0.0%			0.0%	0.0%	0.0%				0.0%	0
			Retail Ground Beef	0 4.1%	0 2.6%	4.2%	5.9%	0 4.5%	0.0%	0.0%	5.6%	6.7%	0.0%	0 6.2%	0.0%
		Cattle	HACCP	4.1%	2.6%	4.2%	2	4.5%	0.0%	0.0%	1	1	0.0%	1	0
		ర	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail Pork Chops	0.0%	0.0%	0.0%	50.0% 1	0.0%	0.0%	0.0%	100.0% 1	0.0%	0.0%	0.0%	0.0%
		9	HACCP	2.1%	3.7%	1.9%	9.5%	4.0%	9.1% 4	10.0%	5.0%	7.7%	0.0%	Ť	Ď
		Swine	Cecal (Market Hogs)										Ť		9.5%
			Cecal (Sows)												0.0%
							samples po								0

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

 $<sup>^{2}\,\</sup>mbox{Sulfamethoxazole}$  was tested from 1996-2003 and was replaced by sulfisoxazole in 2004

Table 48d. Antimicrobial Resistance among Salmonella Typhimurium Isolates, 20002-2013

Year			Salmonella Typhim	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	sted	10	Humans	394	409	382	438	408	405	396	370	359	323	296	325
		Chickens	Retail Chickens HACCP Cecal	9 150	22 156	49 171	29 183	21 105	25 83	68 70	122 36	79 54	66 30	88 105	68 55 15
		Turkeys	Retail Ground Turkey HACCP Cecal	2 9	2 6	2 14	1 7	0 5	1 6	1 3	1 2	6 4	8 2	9 4	1 5
		Cattle	Retail Ground Beef HACCP Cecal (Beef)	2 98	1 78	0 48	0 34	1 22	3 26	2 28	0 18	0 15	0 14	1 16	0 23 14
		ne	Cecal (Dairy)  Retail Pork Chops  HACCP <sup>1</sup>	2 48	1 27	2 53	2 42	2 25	3 44	3 10	1 20	5 13	7 5	6	21 4
	Antimicrobial	Swine	Cecal (Market Hogs) Cecal (Sows)	40	21	55	42	25	44	10	20	13	5		21 4
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
Macrolides	Azithromycin		Humans										0.0%	0.0%	0.0%
	(MIC ≥32 µg/mI)		Retail Chickens										0 0.0% 0	0 0.0% 0	0.0% 0
		Chickens	HACCP										0.0%	0.0%	0.0%
		S	Cecal										0	0	0.0% 0
			Retail Ground Turkey										0.0%	0.0%	0.0%
		Turkeys	HACCP										0.0%	0.0%	0.0%
		2	Cecal											0	0.0%
			Retail Ground Beef											0.0%	
		<u>e</u>	HACCP										0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail Pork Chops										0.0%	0.0%	0.0%
		e.	HACCP										0.0%	0	
		Swine	Cecal (Market Hogs)												4.8%
			Cecal (Sows)												0.0%
Penicillins	Ampicillin		Humans	33.8%	36.4% 149	32.2% 123	29.0%	28.2%	31.6%	26.3%	28.1%	26.2%	26.0%	23.6%	16.6%
	(MIC ≥ 32 μg/ml)	-	Retail Chickens	133 33.3%	72.7%	53.1%	127 55.2%	57.1%	128 48.0%	60.3%	104 68.0%	94 69.6%	66.7%	70 56.8%	54 55.9%
		Chickens	HACCP	3 45.3%	16 32.1%	26 46.8%	16 26.8%	12 42.9%	12 37.3%	28.6%	33.3%	55 35.2%	10.0%	50 27.6%	38 10.9%
		S.	Cecal	68	50	80	49	45	31	20	12	19	3	29	20.0%
			Retail Ground Turkey	0.0%	100.0%	50.0%	100.0%		100.0%	0.0%	0.0%	66.7%	87.5%	44.4%	100.0%
		Turkeys	HACCP	0 55.6%	66.7%	28.6%	57.1%	80.0%	83.3%	33.3%	50.0%	50.0%	0.0%	75.0%	20.0%
		Ę	Cecal	5	4	4	4	4	5	1	1	2	0	3	50.0%
		-		0.0%	0.0%			100.0%	0.0%	50.0%				0.0%	1
			Retail Ground Beef	0 71.4%	0 59.0%	60.4%	73.5%	1 63.6%	0 61.5%	1 50.0%	83.3%	53.3%	57.1%	0 37.5%	39.1%
		Cattle	HACCP	70	46	29	25	14	16	14	15	8	8	6	9 57.1%
			Cecal (Beef)												8 66.7%
			Cecal (Dairy)	50.0%	100.0%	50.0%	100.0%	100.0%	0.0%	0.0%	100.0%	20.0%	28.6%	16.7%	14 75.0%
			Retail Pork Chops	1 62.5%	1 51.9%	1 71.7%	2 66.7%	76.0%	0 70.5%	70.0%	1 80.0%	1 53.8%	2 60.0%	1	3
		Swine	HACCP	30	14	38	28	19	31	70.0%	16	7	3		66.70/
		Ø	Cecal (Market Hogs)												66.7% 14
			Cecal (Sows)	00.40/	00.40/	0.4.00/	0.1.40/	00.40/	05.40/	00.50/	00.50/	22.22/	40.00/	40.00/	50.0%
Phenicols	Chloramphenicol (MIC ≥ 32 µg/ml)		Humans	23.4% 92	28.4% 116	24.3% 93	24.4% 107	22.1% 90	25.4% 103	23.5% 93	20.5% 76	20.3% 73	19.8% 64	18.2% 54	13.5% 44
		SU	Retail Chickens	0.0% 0	9.1% 2	4.1% 2	3.4% 1	0.0%	0.0%	0.0%	0.0%	3.8%	0.0%	0.0%	0.0% 0
		Chickens	HACCP	16.0% 24	5.1% 8	1.8% 3	8.2% 15	7.6% 8	1.2% 1	1.4% 1	0.0% 0	3.7% 2	0.0%	0.0% 0	0.0% 0
		0	Cecal												0.0% 0
		Si Si	Retail Ground Turkey	0.0% 0	50.0% 1	50.0% 1	0.0%		100.0% 1	0.0%	0.0% 0	16.7% 1	0.0%	0.0%	0.0% 0
		Turkeys	HACCP	66.7% 6	50.0% 3	28.6% 4	57.1% 4	60.0% 3	66.7% 4	33.3% 1	0.0%	50.0% 2	0.0%	25.0% 1	0.0% 0
		L	Cecal												0.0% 0
			Retail Ground Beef	0.0%	0.0% 0			100.0% 1	0.0%	50.0% 1				0.0%	
		e He	HACCP	49.0% 48	42.3% 33	54.2% 26	47.1% 16	50.0% 11	65.4% 17	35.7% 10	66.7% 12	46.7% 7	42.9% 6	43.8% 7	30.4% 7
		Cattle	Cecal (Beef)		7.5										28.6% 4
			Cecal (Dairy)												61.9% 13
			Retail Pork Chops	50.0%	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%	100.0%	60.0%	28.6%	0.0%	75.0%
		Θ	HACCP	56.3%	48.1%	60.4%	54.8%	64.0%	65.9%	50.0%	75.0%	46.2%	40.0%	0	3
		Swine	Cecal (Market Hogs)	27	13	32	23	16	29	5	15	6	2		28.6%
			Cecal (Sows)												25.0%
			Imonella hecause in prior												1

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 48e. Antimicrobial Resistance among Salmonella Typhimurium Isolates, 2002-2013

Year Number of Isolates Te	etad		Humans	<b>2002</b> 394	<b>2003</b> 409	<b>2004</b> 382	<b>2005</b> 438	<b>2006</b> 408	<b>2007</b> 405	<b>2008</b> 396	<b>2009</b> 370	<b>2010</b> 359	<b>2011</b> 323	<b>2012</b> 296	<b>2013</b> 325
Number of Isolates Te	ested	S	Humans	1											
		Chickens	Retail Chickens HACCP	9 150	22 156	49 171	29 183	21 105	25 83	68 70	122 36	79 54	66 30	88 105	68 55
		5	Cecal	130	130	171	103	103	03	70	30	34	30	103	15
		ske	Retail Ground Turkey	2	2	2	1	0	1	1	1	6	8	9	1
		Turkeys	HACCP	9	6	14	7	5	6	3	2	4	2	4	5
		<u> </u>	Cecal												2
		_0	Retail Ground Beef	2	1 70	0	0	1	3	2	0	0	0	1	0
		Cattle	HACCP Cecal (Beef)	98	78	48	34	22	26	28	18	15	14	16	23 14
			Cecal (Dairy)												21
			Retail Pork Chops	2	1	2	2	2	3	3	1	5	7	6	4
		Swine	HACCP <sup>1</sup>	48	27	53	42	25	44	10	20	13	5		
		Ó	Cecal (Market Hogs)												21
	Antimicrobial		Cecal (Sows)												4
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
Quinolones	Ciprofloxacin		Humans	0.0%	0.0%	0.0%	0.2%	0.2%	0.0%	0.0%	0.8%	0.0%	0.0%	0.3%	0.0%
	(MIC ≥ 1 μg/ml)	-		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		SL	Retail Chickens	0	0	0	0	0	0	0	0	0	0	0	0
		Chickens	HACCP	0.7% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Ö	Cecal												0.0%
			Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		eys	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0
			Cecal												0.0%
			Retail Ground Beef	0.0%	0.0%			0.0%	0.0%	0.0%				0.0%	
		_	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle		0	0	0	0	0	0	0	0	0	0	0	0.0%
			Cecal (Beef)												0
			Cecal (Dairy)												0.0%
			Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	- 0	0
		Swine		0	0	0	0	0	0	0	0	0	0		4.8%
		0,	Cecal (Market Hogs)												1
		ic Acid	Cecal (Sows)												0.0%
	Nalidixic Acid (MIC ≥ 32 µg/ml)		Humans	1.3% 5	1.2% 5	0.5% 2	0.9% 4	0.7% 3	1.5% 6	1.0% 4	2.2% 8	1.4% 5	0.3% 1	1.7% 5	1.5% 5
	(WIIC ≥ 32 μg/IIII)		Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		sens		0 2.7%	0.0%	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	4	0	0	2	0	0	0	0	0	0	0	0
			Cecal												0.0%
			Retail Ground Turkey	0.0%	50.0% 1	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys	HACCP	1.0%	0.0%	6.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Ţ		1	0	3	0	0	0	0	0	0	0	0	0.0%
			Cecal	0.00/	0.00/			0.00/	0.00/	0.00/				0.00/	0
			Retail Ground Beef	0.0%	0.0%			0.0%	0.0%	0.0%				0.0%	
		<u>o</u>	HACCP	1.0%	0.0%	6.3% 3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.2%	8.7% 2
		Cattle	Cecal (Beef)		0	3	0	Ü		0	0	U	0		0.0%
															0.0%
		<u> </u>	Cecal (Dairy)	0.001	0.001	0.001	0.001	0.004	0.001	0.001	0.001	0.00*	0.001	0.00*	0
			Retail Pork Chops	0.0%	0.0%	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		e e	HACCP	2.1%	0.0%	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%		
		Swine	Cecal (Market Hogs)			0									4.8%
															0.0%
	Tatas avair		Cecal (Sows)	20.007	20.424	20.427	20.40/	04.007	20.007	07.004	00.007	00.007	07.00/	07.00/	0
Tetracyclines	Tetracycline (MIC ≥ 16 µg/ml)	L	Humans	32.0% 126	38.1% 156	30.4% 116	30.4% 133	31.6% 129	36.8% 149	27.8% 110	28.9% 107	29.0% 104	27.2% 88	27.0% 80	21.2% 69
		"	Retail Chickens	44.4% 4	31.8% 7	71.4% 35	69.0% 20	90.5% 19	72.0% 18	92.6% 63	95.9% 117	92.4% 73	92.4% 61	88.6% 78	92.7% 63
		Chickens	HACCP	28.0%	33.3%	44.4%	34.4%	61.0%	60.2%	64.3%	55.6%	72.2%	66.7%	81.9%	74.5%
		Ş		42	52	76	63	64	50	45	20	39	20	86	41 93.3%
		$\vdash$	Cecal	0.001	E0.00'	100.001	0.001		100.004	0.001	100.001	60 701	07.50	44.401	14
		s	Retail Ground Turkey	0.0%	50.0% 1	100.0% 2	0.0% 0		100.0% 1	0.0% 0	100.0% 1	66.7% 4	87.5% 7	44.4% 4	100.0%
		Turkeys	HACCP	77.8% 7	100.0% 6	78.6% 11	57.1% 4	100.0% 5	66.7% 4	66.7% 2	50.0% 1	50.0%	0.0% 0	75.0% 3	40.0% 2
		₽	Cecal		U			,						3	100.0%
		$\vdash$		0.0%	0.0%			100.0%	0.0%	50.0%				0.0%	2
			Retail Ground Beef	0	0	60.401	67.00	1	0	1	90.004	60.001	E7.40/	0	20.45
		Cattle	HACCP	64.3% 63	53.8% 42	60.4% 29	67.6% 23	54.5% 12	65.4% 17	50.0% 14	88.9% 16	60.0% 9	57.1% 8	62.5% 10	39.1% 9
		Saf	Cecal (Beef)												71.4% 10
			Cecal (Dairy)												66.7%
		$\vdash$		100.0%	100.0%	100.0%	100.0%	100.0%	66.7%	33.3%	100.0%	60.0%	57.1%	16.7%	14 75.0%
			Retail Pork Chops	2	1	2	2	2	2	1	1	3	4	10.7%	3
		ne	HACCP	89.6% 43	74.1% 20	90.6% 48	83.3% 35	96.0% 24	88.6% 39	100.0% 10	100.0% 20	76.9% 10	80.0% 4		
		Swine	Cecal (Market Hogs)												61.9%
			Cecal (Sows)												13 75.0%
		1	Cecai (SUWS)												3

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 49a. Resistance Patte Year			2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	394	409	382	438	408	405	396	370	359	323	296	325
	Chickens	Retail Chickens HACCP Cecal	9 150	22 156	49 171	29 183	21 105	25 83	68 70	122 36	79 54	66 30	88 105	68 55 15
		Retail Ground Turkey	2	2	2	1	0	1	1	1	6	8	9	1
	Turkeys	HACCP Cecal	9	6	14	7	5	6	3	2	4	2	4	5 2
	Cattle	Retail Ground Beef HACCP Cecal (Beef)	2 98	1 78	0 48	0 34	1 22	3 26	2 28	0 18	0 15	0 14	1 16	0 23 14
		Cecal (Dairy)  Retail Pork Chops	2 48	1 27	2 53	2 42	2 25	3 44	3 10	1 20	5 13	7 5	6	21 4
	Swin	HACCP <sup>2</sup> Cecal (Market Hogs) Cecal (Sows)	48	21	53	42	25	44	10	20	13	5		21 4
Resistance Pattern	-	Source	59.9%	54.5%	60.5%	65.1%	62.5%	57.5%	67.9%	63.5%	66.9%	69.0%	68.6%	69.5%
1. No Resistance Detected		Humans	236 22.2%	223 22.7%	231 14.3%	285 24.1%	255 0.0%	233 24.0%	269 5.9%	235 2.5%	240 3.8%	223 4.6%	203 9.1%	226 7.4%
	sue	Retail Chickens	2	5	7	7	0	6	4	3	3 22.2%	3	8	5
	Chickens	HACCP	37.3% 56	45.5% 71	40.9% 70	54.1% 99	30.5% 32	30.1% 25	27.1% 19	33.3% 12	12	30.0% 9	15.2% 16	23.6% 13
	L	Cecal												6.7% 1
		Retail Ground Turkey	100.0% 2	0.0%	0.0%	0.0%		0.0% 0	100.0% 1	0.0%	33.3% 2	12.5% 1	44.4% 4	0.0%
	Turkeys	HACCP	0.0%	0.0%	14.3% 2	42.9% 3	0.0%	16.7% 1	0.0%	0.0%	50.0% 2	100.0% 2	25.0% 1	60.0%
	ľ	Cecal												0.0%
	$\vdash$	Retail Ground Beef	100.0%	100.0%			0.0%	100.0%	50.0%				100.0%	0
	_	HACCP	2 19.4%	1 39.7%	35.4%	26.5%	31.8%	3 34.6%	1 46.4%	5.5%	40.0%	42.9%	1 37.5%	56.5%
	Cattle		19	31	17	9	7	9	13	1	6	6	6	13 28.6%
		Cecal (Beef)												4
	<u> </u>	Cecal (Dairy)						02.22	000					33.3%
		Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	33.3% 1	66.7% 2	0.0%	0.0%	28.6% 2	50.0% 3	25.0% 1
	e e	HACCP	8.3% 4	18.5% 5	3.8%	16.7% 7	0.0%	6.8% 3	0.0%	0.0%	23.1% 3	0.0%		
	Swine	Cecal (Market Hogs)												19.0% 4
		Cecal (Sows)												0.0%
		Humans	32.5%	37.4%	31.7%	30.1%	30.4%	34.3%	27.8%	28.1%	27.3%	26.3%	24.7%	0 16.9%
2. Resistant to ≥ 3 Antimicrobial Classes		Retail Chickens	128 33.3%	153 72.7%	121 71.4%	132 58.6%	124 81.0%	139 68.0%	110 77.9%	104 75.4%	98 75.9%	85 71.2%	73 64.8%	55 63.2%
	sue		3 46.0%	16 34.6%	35 48.5%	17 30.6%	17 55.2%	17 39.8%	53 31.4%	92 38.9%	60 44.4%	47 16.7%	57 37.1%	43 16.4%
	Chickens	HACCP	69	54	83	56	58	33	22	14	24	5	39	9 20.0%
		Cecal												3
	s,	Retail Ground Turkey	0.0%	100.0%	100.0%	100.0% 1		100.0% 1	0.0% 0	0.0% 0	66.7% 4	87.5% 7	44.4% 4	100.0% 1
	Turkeys	HACCP	77.8% 7	100.0%	71.4% 10	57.1% 4	80.0% 4	83.3% 5	33.3% 1	50.0% 1	50.0%	0.0%	75.0% 3	20.0%
	-	Cecal												100.0%
		Retail Ground Beef	0.0%	0.0%			100.0%	0.0%	50.0%				0.0%	
		HACCP	70.4%	0 59.0%	60.4%	73.5%	59.1%	0 65.4%	50.0%	83.3%	53.3%	57.1%	62.5%	39.1%
	Cattle	Cecal (Beef)	69	46	29	25	13	17	14	15	8	8	10	9 57.1%
														8 66.7%
		Cecal (Dairy)	50.0%	100.0%	100.0%	100.0%	100.0%	0.0%	33.3%	100.0%	80.0%	57.1%	16.7%	14 75.0%
		Retail Pork Chops	1	1	2	2	2	0	1	1	4	4	16.7%	75.0%
	Swine	HACCP	75.0% 36	55.6% 15	77.4% 41	71.4% 30	96.0% 24	72.7% 32	80.0% 8	85.0% 17	61.5% 8	60.0% 3		
	Š	Cecal (Market Hogs)												57.1% 12
	ĺ	Cecal (Sows)												75.0% 3
3. Resistant to ≥ 4		Humans	28.4% 112	32.5% 133	27.7% 106	27.4% 120	27.0% 110	29.9% 121	24.7% 98	24.1% 89	24.2% 87	22.0% 71	20.9% 62	14.8% 48
3. Resistant to 2 4 Antimicrobial Classes	H	Retail Chickens	0.0%	36.4%	46.9%	48.3%	47.6%	40.0%	54.4%	60.7%	63.3%	59.1%	55.7%	54.4%
	Chickens	HACCP	0 25.3%	19.9%	23 37.4%	14 21.3%	10 38.1%	10 31.3%	37 25.7%	74 25.0%	50 31.5%	39 6.7%	49 28.6%	37 9.1%
	Chić	Cecal	38	31	64	39	40	26	18	9	17	2	30	5 13.3%
	$\vdash$		0.0%	50.0%	50.0%	0.0%		100.0%	0.0%	0.0%	66.7%	62.5%	44.4%	2 100.0%
	eys	Retail Ground Turkey	0 66.7%	1 66.7%	1 28.6%	0 57.1%	60.0%	1 66.7%	0 33.3%	0 50.0%	4 50.0%	5 0.0%	4 75.0%	0.0%
	Turkeys	HACCP	6	4	4	4	3	4	1	1	2	0	3	0.0%
	<u> </u>	Cecal	0.0%	0.0%			100.0%	0.0%	50.0%				0.0%	0
	ĺ	Retail Ground Beef	0.0%	0.0%	60.4%	64.7%	1 54.5%	0.0%	1 46.4%	77.8%	53.3%	57.1%	0.0%	34.8%
	Cattle	HACCP	58.2% 57	51.3% 40	60.4%	64.7%	54.5% 12	61.5% 16	46.4% 13	77.8% 14	53.3%	57.1% 8	43.8% 7	8
	0	Cecal (Beef)												57.1% 8
	L	Cecal (Dairy)												66.7% 14
		Retail Pork Chops	50.0% 1	100.0%	100.0%	100.0% 2	100.0%	0.0%	0.0%	100.0%	20.0%	28.6% 2	16.7% 1	75.0% 3
	١	HACCP	60.4% 29	51.9% 14	71.7%	66.7%	72.0%	70.5%	70.0%	75.0%	53.8%	60.0%		Ť
	9				38	28	18	31	/	15	/	3		
	Swine	Cecal (Market Hogs)	29	14										47.6%
	Swine	Cecal (Market Hogs)  Cecal (Sows)	29	17										47.6% 10 50.0% 2

<sup>1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

<sup>&</sup>lt;sup>2</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 49b. Resistance Patte	rns	among Saimoneila	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	394	409	382	438	408	405	396	370	359	323	296	325
	Chickens	Retail Chickens HACCP Cecal	9 150	22 156	49 171	29 183	21 105	25 83	68 70	122 36	79 54	66 30	88 105	68 55 15
	Turkeys	Retail Ground Turkey HACCP Cecal	2 9	2 6	2 14	1 7	0 5	1 6	1 3	1 2	6 4	8 2	9 4	1 5 2
	Cattle	Retail Ground Beef HACCP Cecal (Beef) Cecal (Dairy)	2 98	1 78	0 48	0 34	1 22	3 26	2 28	0 18	0 15	0 14	1 16	0 23 14 21
	Swine	Retail Pork Chops HACCP <sup>2</sup> Cecal (Market Hogs)	2 48	1 27	2 53	2 42	2 25	3 44	3 10	1 20	5 13	7 5	6	4 21
Resistance Pattern		Cecal (Sows) Source												4
4. Resistant to ≥ 5		Humans	23.1% 91	27.9% 114	24.3% 93	22.8% 100	20.8% 85	24.9% 101	24.0% 95	22.2% 82	20.9% 75	21.1% 68	18.6% 55	12.3% 40
Antimicrobial Classes	s	Retail Chickens	0.0%	27.3% 6	44.9% 22	48.3% 14	47.6% 10	40.0% 10	47.1% 32	56.6% 69	60.8% 48	53.0% 35	55.7% 49	50.0% 34
	Chickens	HACCP	20.0% 30	17.3% 27	36.3% 62	19.7% 36	35.2% 37	30.1% 25	22.8% 16	25.9% 9	29.6% 16	6.7% 2	26.7% 28	9.1% 5
	ò	Cecal	30	EI	ÜŽ.	30	31	23	10	3	10		20	13.3%
		Retail Ground Turkey	0.0%	50.0%	50.0%	0.0%		100.0%	0.0%	0.0%	66.7%	62.5%	22.2%	100.0%
	Turkeys	HACCP	0 55.6%	1 50.0%	1 28.6%	0 57.1%	60.0%	1 33.3%	33.3%	50.0%	4 50.0%	5 0.0%	75.0%	0.0%
	Þ	Cecal	5	3	4	4	3	2	1	1	2	0	3	0.0%
			0.0%	0.0%			100.0%	0.0%	50.0%				0.0%	0
		Retail Ground Beef	0 35.7%	0 33.3%	58.3%	50.0%	1 50.0%	0 61.5%	1 35.7%	72.2%	46.7%	42.9%	0 37.5%	30.4%
	Cattle	HACCP	35	26	28	17	11	16	10	13	7	6	6	7
	O	Cecal (Beef)												35.7% 5
		Cecal (Dairy)												61.9% 13
		Retail Pork Chops	0.0%	0.0%	50.0% 1	100.0% 2	0.0%	0.0%	0.0%	100.0% 1	20.0% 1	28.6% 2	0.0%	75.0% 3
	e.	HACCP	47.9% 23	48.1% 13	60.4% 32	54.8% 23	44.0% 11	47.7% 21	40.0% 4	70.0% 14	46.2% 6	40.0% 2		
	Swine	Cecal (Market Hogs)	-20	10	02	20						-		38.1%
		Cecal (Sows)												25.0%
		Humans	21.6%	26.7%	23.6%	22.4%	19.6%	22.7%	23.2%	19.5%	18.7%	19.8%	17.2%	1 12.0%
5. At Least ACSSuT <sup>3</sup> Resistant		Retail Chickens	85 0.0%	109 9.1%	90 4.1%	98 3.5%	80 0.0%	92 0.0%	92 0.0%	72 0.0%	67 2.5%	0.0%	51 0.0%	39 0.0%
	kens	HACCP	0 12.7%	3.2%	1.8%	7.1%	0 6.7%	0 1.2%	0.0%	0.0%	2 3.7%	0.0%	0.0%	0.0%
	Chickens		19	5	3	13	7	1	0	0	2	0	0	0.0%
		Cecal	0.0%	50.0%	50.0%	0.0%		100.0%	0.0%	0.0%	16.7%	0.0%	0.0%	0
	iys	Retail Ground Turkey	0	1	1	0	00.00/	1	0	0	1	0	0	1
	Turkeys	HACCP	44.4% 4	50.0% 3	28.6% 4	57.1% 4	60.0%	33.3% 2	33.3% 1	0.0% 0	50.0% 2	0.0% 0	25.0% 1	0.0%
		Cecal												0.0% 0
		Retail Ground Beef	0.0%	0.0%			100.0%	0.0%	50.0%				0.0%	
	Cattle	HACCP	31.6% 31	28.2% 22	54.2% 26	41.2% 14	50.0% 11	50.0% 13	35.7% 10	66.7% 12	46.7% 7	42.9% 6	37.5% 6	30.4% 7
	O	Cecal (Beef)												28.6% 4
		Cecal (Dairy)												61.9% 13
		Retail Pork Chops	50.0% 1	100.0%	50.0% 1	100.0% 2	0.0%	0.0% 0	0.0%	100.0% 1	20.0% 1	28.6% 2	0.0%	75.0% 3
	Swine	HACCP	47.9% 23	44.4% 12	60.4% 32	50.0% 21	44.0% 11	47.7% 21	30.0% 3	70.0% 14	15.4% 2	40.0% 2		
	Š	Cecal (Market Hogs)												28.6% 6
		Cecal (Sows)												251.0%
6. At Least ACT/S <sup>4</sup> Resistant	L	Humans	2.0% 8	3.2% 13	1.6% 6	2.1% 9	0.7% 3	2.0% 8	0.5% 2	2.2% 8	1.1% 4	0.6%	0.7% 2	0.0% 0
	SI	Retail Chickens	0.0%	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Ö	Cecal												0.0%
		Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	F	Cecal												0.0%
		Retail Ground Beef	0.0%	0.0%			0.0%	0.0%	0.0%				0.0%	
	욢	HACCP	3.1%	2.6%	4.2%	2.9%	4.5%	0.0%	0.0%	5.6%	6.7%	0.0%	6.3%	0.0%
	Cattle	Cecal (Beef)	3	2	2			0	0					0.0%
		Cecal (Dairy)												0.0%
		Retail Pork Chops	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
	0	HACCP	2.1%	0.0%	1.9%	7.1%	4.0%	9.1%	0.0%	0.0%	0.0%	0.0%	0	0
	Swine	Cecal (Market Hogs)	1	0	1	3	1	4	0	0	0	0		0.0%
		Cecal (Sows)												0.0%
<sup>1</sup> Starting in 2011, testing included r	ine ar		the addition	of the macro	l olide azithror	mvcin. Beca	use resistano	e to azithror	nycin is low	(in this case.	<1%), antim	icrobial		0

Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

In 2012 and 2013, FSIS did not sample products for Salmoneilla because in prior years the percent of pork carcass samples positive for Salmoneilla was consistently low

ACSIVE amplicillic, holoramphenicol, styteptomycin, sulfamethoxazole, and tetracycline

ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole

Table 49c. Resistance Patterns among Salmonella Typhimurium Isolates, 2002-2013

Year		Humana	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested	s	Humans Retail Chickens	394 9	409 22	382 49	438 29	408 21	405 25	396 68	370 122	359 79	323 66	296 88	325 68
	ckens	HACCP	150	156	171	183	105	83	70	36	79 54	30	105	55
	Chick	Cecal												15
	eys	Retail Ground Turkey	2	2	2	1	0	1	1	1	6	8	9	1
	Turkeys	HACCP Cecal	9	6	14	7	5	6	3	2	4	2	4	5 2
		Retail Ground Beef	2	1	0	0	1	3	2	0	0	0	1	0
	Cattle	HACCP Cecal (Beef)	98	78	48	34	22	26	28	18	15	14	16	23 14
		Cecal (Dairy)												21
		Retail Pork Chops	2	1	2	2	2	3	3	1	5	7	6	4
	Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	48	27	53	42	25	44	10	20	13	5		21
Resistance Pattern		Cecal (Sows) Source												4
		Humans	1.8%	2.4%	2.6%	1.8%	2.9%	3.7%	2.3%	1.6%	1.7%	5.3%	4.1%	2.2%
7. At Least ACSSuTAuCx <sup>2</sup> Resistant	<b> </b>	Retail Chickens	7 0.0%	10 0.0%	10 4.1%	8	12 0.0%	15 0.0%	9	6 0.0%	0.0%	17 0.0%	12 0.0%	7 0.0%
	ens		0 2.0%	0.6%	0.0%	0 1.1%	0.0%	0.0%	0.0%	0.0%	0 1.9%	0.0%	0.0%	0.0%
	Chickens	HACCP	3	1	0.0%	2	0.0%	0.0%	0.0%	0.0 %	1.976	0.0%	0.0%	0
		Cecal												0.0%
		Retail Ground Turkey	0.0%	50.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Turkeys	HACCP	11.1%	16.7%	14.2%	0.0%	0.0%	16.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	2	Cecal	1	1	2	0	0	1	0	0	0	0	0	0.0%
	<u> </u>		0.0%	0.0%			0.0%	0.0%	0.0%				0.0%	0
		Retail Ground Beef	0	0	00.00/	00.50/	0	0	0	40.70/	00.00/	05.70/	0	00.40/
	Cattle	HACCP	11.2% 11	12.8% 10	20.8% 10	26.5% 9	22.7% 5	26.9% 7	21.4% 6	16.7% 3	20.0% 3	35.7% 5	12.5% 2	30.4% 7
	Ö	Cecal (Beef)												14.3% 2
		Cecal (Dairy)												52.4% 11
		Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			0 4.2%	0.0%	0.0%	0 2.4%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0	0
	Swine	HACCP	2	0	0	1	0	1	0	0	0	0		0.0%
	o o	Cecal (Market Hogs)												0
		Cecal (Sows)												0.0% 0
8. At Least Ceftriaxone and		Humans	0.5%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.5%	0.3%	0.0%	0.7%	0.0%
Nalidixic Acid Resistant		Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0 2.7%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Sign		4	0	0	1	0	0	0	0	0	0	0	0.0%
	<u> </u>	Cecal												0
	s	Retail Ground Turkey	0.0%	50.0% 1	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0
	Turkeys	HACCP	22.2% 2	16.7% 1	14.3% 2	0.0%	0.0%	16.7% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	F	Cecal			_		-		-	-	-			0.0%
	$\vdash$	Retail Ground Beef	0.0%	0.0%			0.0%	0.0%	0.0%				0.0%	0
			0.0%	0.0%	4.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.7%
	Cattle	HACCP	0	0	2	0	0	0	0	0	0	0	0	0.0%
		Cecal (Beef)												0
		Cecal (Dairy)												0.0% 0
		Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	m	HACCP	2.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	,	
	Swine	Cecal (Market Hogs)	1	0	0	0	0	0	0	0	0	0		0.0%
														0.0%
		Cecal (Sows)												0.078

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low <sup>2</sup> ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

Table 50a. Antimicrobial Resistance among Salmonella Newport Isolates, 2002-2013

	e 50a. Antimicrobial Resistance among Salmonella Newport														
Year			Humans	2002	2003	2004	2005	2006	<b>2007</b> 222	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ed	S	l	244	226	192	207	219		258	239	306	285	258	209
		Chicken	Retail Chickens HACCP	2 6	0 7	0	0 6	0	0	0	0	0	0	1 2	2 2
		Ş	Cecal	Ü	,	o o	· ·			·	Ü			2	0
		sys	Retail Ground Turkey	1	2	2	3	0	0	3	3	2	0	2	0
				10	19	7	5	4	15	8	3	5	4	4	4
		_	Cecal												0
		Φ	Retail Ground Beef	3	1	2	0	0	0	3	2	2	0	1	0
		Cattle	HACCP Cecal (Beef)	113	75	44	27	30	30	31	17	5	13	5	13 8
			Cecal (Dairy)												7
			Retail Pork Chops	2	1	0	0	0	0	0	0	0	0	0	0
		Swine	HACCP <sup>1</sup>	0	3	0	1	1	1	2	0	0	1		
		Ś	Cecal (Market Hogs)												3
	Antimicrobial		Cecal (Sows)												4
	(Resistance		Isolate												
Antimicrobial Class Aminoglycosides	Breakpoint) Gentamicin		Source	3.3%	3.1%	0.5%	1.0%	0.9%	0.9%	0.4%	0.4%	0.3%	0.7%	0.0%	0.5%
7 ammogry occined	(MIC ≥ 16 μg/ml)	<u> </u>	Humans	8	7	1	2	2	2	1	1	1	2	0	1
		S	Retail Chickens	0.0%							0.0%			0.0%	0.0%
		Chickens	HACCP	0.0%	0.0%		16.7% 1		0.0%	0.0%		0.0%	0.0%	0.0%	0.0%
		ర్	Cecal	U	0				0	0		0	0	0	0
		-		0.0%	50.0%	0.0%	0.0%			33.3%	33.3%	50.0%		50.0%	50.0%
		s/	Retail Ground Turkey	0	1	0	0			1	1	1		1	1
		Turkeys	HACCP	0.0%	52.6% 10	14.3% 1	80.0% 4	50.0% 2	0.0%	25.0% 2	66.7% 2	0.0%	0.0%	0.0%	0.0%
		ľ	Cecal												
			Retail Ground Beef	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%		0.0%	
			Retail Ground Beel	0	0	0	0.00/	2.20/	0.00/	0	0	0	0.00/	0	0.00/
		ttle	HACCP	7.1% 8	1.3% 1	0.0% 0	0.0%	3.3% 1	0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0% 0	0.0% 0
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
		ne		0.0%	0.0%										0
			Retail Pork Chops	0.070	0										
			HACCP		0.0%		0.0%	0.0%	0.0%	0.0%			0.0%		
		Swine	Cecal (Market Hogs)		-								-		0.0%
															0.0%
		-	Cecal (Sows)	0.00/	4.40/	0.00/	1.00/	0.70/	0.00/	0.50/	4.70/	0.70/	0.40/	0.00/	0
	Kanamycin (MIC ≥ 64 μg/mI)		Humans	9.8% 24	4.4% 10	2.6% 5	1.9% 4	2.7% 6	0.9%	3.5% 9	1.7% 4	0.7% 2	0.4% 1	0.0%	0.5% 1
			Retail Chickens	0.0%							0.0%			0.0%	0.0%
		Chickens	HACCP	0.0%	0.0%		33.3%		0.0%	0.0%	0	0.0%	0.0%	0.0%	0.0%
		Shic		0	0		2		0	0		0	0	0	0
		Ĺ	Cecal												
		,,	Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%			0.0%	0.0%	0.0% 0		50.0% 1	
		Turkeys	HACCP	10.0%	21.1%	14.3%	80.0%	50.0%	6.7%	37.5%	33.3%	20.0%	25.0%	0.0%	0.0%
		Ē		1	4	1	4	2	1	3	1	1	1	0	0
		<u> </u>	Cecal	0.00/	0.00/	0.00/				00.00/	0.00/	50.00/		0.00/	
			Retail Ground Beef	0.0%	0.0%	0.0%				33.3% 1	0.0%	50.0% 1		0.0%	
		<u>o</u>	HACCP	15.9% 18	17.3% 13	25.0% 11	14.8% 4	13.3% 4	10.0% 3	0.0%	5.9% 1	0.0%	7.7% 1	0.0%	15.4% 2
		Cattle	Cecal (Reef)	18	13	- 11	4	4	3	0		U	1	U	0.0%
		1	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail Pork Chops	0.0%	0.0%										
		Ф	HACCP		0.0%		0.0%	0.0%	0.0%	0.0%			0.0%		
		Swine	Cecal (Market Hogs)		0		0	0	0	0			0		0.0%
		"	. ,												0
		$oxed{oxed}$	Cecal (Sows)												0.0% 0
	Streptomycin (MIC ≥ 64 µg/mI)		Humans	25.0% 61	24.3% 55	16.1% 31	14.0% 29	14.2% 31	10.4% 23	13.6% 35	8.4% 20	8.5% 26	4.2% 12	3.9% 10	5.7% 12
	, = 04 µg/illi)		Retail Chickens	100.0%	55	01		, , , , , , , , , , , , , , , , , , ,	-25	55	0.0%	20	14	0.0%	0.0%
		tens		0.0%	85.7%		50.0%		0.0%	100.0%	0	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	0.070	6		3		0.070	1		0.070	0.070	0.070	0.070
			Cecal												
			Retail Ground Turkey	100.0% 1	50.0% 1	0.0%	0.0%			33.3% 1	33.3% 1	50.0% 1		50.0% 1	
		Turkeys	HACCP	0.0%	31.6%	14.3%	80.0%	0.0%	6.7%	25.0%	66.7%	0.0%	0.0%	25.0%	0.0%
		Tur		0	6	1	4	0	1	2	2	0	0	1	0
			Cecal												
			Retail Ground Beef	66.7% 2	100.0% 1	100.0% 2				66.7% 2	0.0%	100.0% 2		0.0%	
		a)	HACCP	80.5%	84.0%	84.1%	81.5%	83.3%	83.3%	74.2%	70.6%	60.0%	76.9%	80.0%	76.9%
		Cattle		91	63	37	22	25	25	23	12	3	10	4	10 75.0%
			Cecal (Beef)												6
		l	Cecal (Dairy)												71.4% 5
			Retail Pork Chops	100.0%	100.0%										
			HACCP	2	100.0%		0.0%	0.0%	0.0%	50.0%			0.0%		
		Swine			3		0	0	0	1			0		66.7%
		Ó	Cecal (Market Hogs)												2
			Cecal (Sows)												0.0%
1	did not comple products for		Imonella because in prior y	ears the ne	rcent of nor	c carcage e	amnles nos	itive for Sale	nonella was	s consistent	ly low				J

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 50b. Antimicrobial Resistance among Salmonella Newport Isolates, 2002-2013

Table 50b. Antimicrobial Resistance among Salmonella Newport															
Year Number of Isolates Test	ad		Humans	<b>2002</b> 244	<b>2003</b> 226	<b>2004</b> 192	<b>2005</b> 207	<b>2006</b> 219	<b>2007</b> 222	<b>2008</b> 258	<b>2009</b> 239	<b>2010</b> 306	<b>2011</b> 285	<b>2012</b> 258	<b>2013</b> 209
reuniber of isolates l'est	Gu	us	Retail Chickens	2	0	0	0	0	0	0	1	0	0	1	209
		Chickens	HACCP	6	7	0	6	0	3	1	0	1	1	2	2
		Ö	Cecal	_											0
		Turkeys	Retail Ground Turkey HACCP	1 10	2 19	2 7	3 5	0 4	0 15	3 8	3	2 5	0 4	2 4	0 4
			Cecal	10	19	,	5	4	15	8	3	5	4	4	0
			Retail Ground Beef	3	1	2	0	0	0	3	2	2	0	1	0
		Cattle	HACCP	113	75	44	27	30	30	31	17	5	13	5	13
		0	Cecal (Beef) Cecal (Dairy)												8 7
			Retail Pork Chops	2	1	0	0	0	0	0	0	0	0	0	0
		Swine	HACCP <sup>1</sup>	0	3	0	1	1	1	2	0	0	1		
		Ó	Cecal (Market Hogs) Cecal (Sows)												3 4
	Antimicrobial														7
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin- Clavulanic Acid		Humans	22.5% 55	21.7% 49	15.6% 30	12.6% 26	12.8% 28	8.1% 18	12.4% 32	7.5% 18	7.8% 24	3.9% 11	6.2% 16	5.3% 11
initibilor Combinations	(MIC ≥ 32 / 16 µg/ml)		Retail Chickens	0.0%	43	30	20	20	10	32	0.0%	24		0.0%	0.0%
		Chickens	HACCP	0.0%	85.7%		50.0%		0.0%	100.0%	0	0.0%	0.0%	0.0%	0.0%
		Chic		0	6		3		0	1		0	0	0	0
		_	Cecal	100.0%	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%		50.0%	
		ys	Retail Ground Turkey	1	0	0	0	05.00/	0.70/	0	0	0	05.00/	1	0.00/
		Turkeys	HACCP	0.0%	10.5% 2	14.3% 1	0.0% 0	25.0% 1	6.7% 1	25.0% 2	33.3% 1	20.0% 1	25.0% 1	0.0% 0	0.0%
		-	Cecal												
			Retail Ground Beef	66.7% 2	100.0%	100.0% 2				66.7% 2	0.0%	50.0% 1		0.0%	
		Ф	HACCP	78.8%	81.3%	77.3%	81.5%	76.7%	76.7%	64.5%	58.8%	60.0%	76.9%	40.0%	76.9%
		Cattle	Cecal (Beef)	89	61	34	22	23	23	20	10	3	10	2	10 75.0%
	_														6 71.4%
			Cecal (Dairy)	100.0%	100.0%										5
			Retail Pork Chops	2	1										
		Swine	HACCP		100.0%		0.0% 0	0.0% 0	0.0% 0	50.0% 1			0.0% 0		
		Š	Cecal (Market Hogs)												33.3% 1
			Cecal (Sows)												0.0%
Cephems	Cefoxitin (MIC > 32 µg/ml)		Humans	22.1%	21.7%	15.6%	12.6%	13.2%	8.1%	12.4%	6.7%	7.5%	3.9%	6.2%	5.3%
	(MIC ≥ 32 μg/mI)	-	Retail Chickens	54 0.0%	49	30	26	29	18	32	16 0.0%	23	11	16 0.0%	0.0%
		ens		0.0%	71.4%		50.0%		0.0%	100.0%	0	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	0	5		3		0	1		0	0	0	0
			Cecal												
		s	Retail Ground Turkey	100.0% 1	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%		50.0% 1	
		Cattle	HACCP	0.0%	10.5% 2	14.3% 1	0.0%	25.0% 1	6.7% 1	25.0% 2	33.3% 1	20.0%	25.0% 1	0.0%	0.0%
			Cecal												, ,
			Retail Ground Beef	66.7%	100.0%	100.0%				66.7%	0.0%	50.0%		0.0%	
				2 77.9%	1 74.7%	77.3%	81.5%	70.0%	76.7%	2 64.5%	0 52.9%	60.0%	76.9%	0 40.0%	76.9%
			HACCP	88	56	34	22	21	23	20	6	3	10	2	10 75.0%
			Cecal (Beef)												6
			Cecal (Dairy)												71.4% 5
			Retail Pork Chops	100.0% 2	100.0% 1										
		Э	HACCP		100.0%		0.0%	0.0%	0.0%	50.0% 1			0.0%		
		Swine	Cecal (Market Hogs)					Ť					Ť		33.3%
			Cecal (Sows)												0.0%
	Ceftiofur	┢		22.5%	22.1%	15.6%	12.6%	12.8%	8.1%	12.4%	7.1%	7.5%	3.9%	6.2%	0 5.3%
	(MIC ≥ 8 μg/mI)		Humans	55	50	30	26	28	18	32	17	23	11	16	11 0.0%
		SUE	Retail Chickens	0	05 701		F0.001		0.001	400.000	0.0%	0.001	0.001	0	0
		Chickens	HACCP	0.0%	85.7% 6		50.0% 3		0.0% 0	100.0% 1		0.0% 0	0.0% 0	0.0% 0	0.0% 0
		Ö	Cecal												
			Retail Ground Turkey	100.0%	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%		50.0% 1	
		Turkeys	HACCP	0.0%	10.5%	14.3%	0.0%	25.0%	6.7%	25.0%	33.3%	20.0%	25.0%	0.0%	0.0%
		Ī	Cecal	0	2	1	0	1	1	2	1	1	1	0	0
		-		66.7%	100.0%	100.0%				66.7%	0.0%	50.0%		0.0%	
			Retail Ground Beef	78.8%	1 81.3%	2 77.3%	81.5%	76.7%	76.7%	64.5%	0 58.8%	1 60.0%	76.9%	0 40.0%	76.9%
		Cattle	HACCP	78.8% 89	81.3% 61	77.3% 34	81.5% 22	76.7% 23	76.7% 23	20	10	60.0%	76.9% 10	40.0%	10
		రొ	Cecal (Beef)												75.0% 6
			Cecal (Dairy)												71.4% 5
			Retail Pork Chops	100.0%	100.0%										
		m	HACCP	2	100.0%		0.0%	0.0%	0.0%	50.0%			0.0%		
		Swine			3		0	0	0	1			0		33.3%
		3,	Cecal (Market Hogs)												1 0.0%
			Cecal (Sows)												0.0%

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Year	Dual Resistance amo	ong (	Saimonella Newport	t Isolates, 2002-2013 2002 2003 2004 2005 2006 2007 2008							2009	2009 2010 2011 2012					
Number of Isolates Test	ted		Humans	244	226	192	207	219	222	258	239	306	285	258	<b>2013</b> 209		
		Chickens	Retail Chickens HACCP	2	0 7	0	0	0	0	0	1 0	0	0	1 2	2 2		
		Chic	Cecal		,	0	6	U	3	,	U	,	,	2	0		
		ceys	Retail Ground Turkey	1	2	2	3	0	0	3	3	2	0	2	0		
		Ţ	HACCP Cecal	10	19	7	5	4	15	8	3	5	4	4	4 0		
				3	1	2	0	0	0	3	2	2	0	1	0		
		Cattle	HACCP Cecal (Beef)	113	75	44	27	30	30	31	17	5	13	5	13 8		
			Cecal (Dairy)												7		
		Je.	Retail Pork Chops HACCP <sup>1</sup>	2	1 3	0	0	0	0	0 2	0	0	0	0	0		
		Swine	Cecal (Market Hogs)	0	3	0	'	'	'	2	U	U	'		3		
	Antimicrobial		Cecal (Sows)												4		
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source														
Cephems	Ceftriaxone (MIC ≥ 4 µg/mI)	İ	Humans	22.5% 55	21.7% 49	15.1% 29	12.6% 26	13.2% 29	8.1% 18	12.4% 32	7.1% 17	7.5% 23	3.9% 11	6.2% 16	5.3% 11		
	(IVIIC 2 4 µg/IIII)		Retail Chickens	0.0%	43	29	20	25	10	32	0.0%	23	- ''	0.0%	0.0%		
		Chickens	HACCP	0.0%	85.7%		50.0%		0.0%	100.0%	0	0.0%	0.0%	0.0%	0.0%		
		Ą	Cecal	0	6		3		0	1		0	0	0	0		
			Retail Ground Turkey	100.0%	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%		50.0%			
		eys	-	0.0%	0 10.5%	0 14.3%	0.0%	25.0%	6.7%	0 25.0%	0 33.3%	0 20.0%	25.0%	0.0%	0.0%		
		Turkeys	HACCP	0	2	1	0	1	1	2	1	1	1	0.070	0		
	-	-	Cecal	66.7%	100.0%	100.0%				66.7%	0.0%	50.0%		0.0%			
			Retail Ground Beef	2	1	2	01.57	70.75	70	2	0	1	70.001	0	70.00		
		Cattle	HACCP	78.8% 89	81.3% 61	77.3% 34	81.5% 22	76.7% 23	76.7% 23	64.5% 20	58.8% 10	60.0% 3	76.9% 10	40.0% 2	76.9% 10		
		రొ	Cecal (Beef)												75.0% 6		
			Cecal (Dairy)												71.4% 5		
			Retail Pork Chops	100.0% 2	100.0% 1												
		9	HACCP		100.0%		0.0%	0.0%	0.0%	50.0%			0.0%				
		Swine	Cecal (Market Hogs)		3		0	0	0	1			0		33.3%		
			Cecal (Sows)												0.0%		
Folate Pathway Inhibito	Sulfamethoxazole/	-		25.4%	24.8%	17.2%	15.5%	15.5%	10.4%	13.2%	8.8%	7.8%	4.6%	3.9%	0 4.8%		
	Sulfisoxazole <sup>2</sup> (MIC ≥ 512 μg/mI)	-	Humans	62 0.0%	56	33	32	34	23	34	21 0.0%	24	13	10 0.0%	10 0.0%		
	, , ,	ens	Retail Chickens	0.0%	71.4%		50.0%		0.0%	100.0%	0	0.0%	0.0%	0.0%	0.0%		
		Chickens	HACCP	0	5		3		0.070	1		0.070	0.070	0.070	0.070		
		Ĺ	Cecal														
		s,	Retail Ground Turkey	100.0% 1	50.0% 1	0.0%	0.0% 0			33.3% 1	33.3% 1	50.0% 1		50.0% 1			
		Turkeys	HACCP	0.0%	52.6% 10	14.3% 1	80.0% 4	75.0% 3	0.0%	37.5% 3	100.0% 3	0.0%	25.0% 1	25.0% 1	0.0%		
			Cecal														
			Retail Ground Beef	66.7%	100.0%	100.0%				66.7% 2	0.0%	100.0%		0.0%			
		<u>e</u>	HACCP	74.3% 84	73.3% 55	77.3% 34	85.2% 23	83.3% 25	83.3% 25	74.2% 23	70.6% 12	60.0%	76.9% 10	80.0% 4	76.9% 10		
		Cattle	Cecal (Beef)	04	33	34	25	25	25	25	12	J	10		75.0%		
			Cecal (Dairy)												71.4%		
		$\vdash$	Retail Pork Chops	100.0%	100.0%										5		
			HACCP	2	100.0%		0.0%	0.0%	0.0%	50.0%			0.0%				
		Swine			3		0	0	0	1			0		33.3%		
		1	Cecal (Market Hogs)												1 0.0%		
	Trimethoprim-	-	Cecal (Sows)	4.1%	1.3%	2.1%	1.9%	3.7%	1.8%	3.1%	1.3%	1.3%	0.0%	0.4%	0.5%		
	Sulfamethoxazole		Humans	10	3	4	1.9%	8	1.8%	3.1%	3	1.3%	0.0%	1	1		
	(MIC ≥ 4 / 76 μg/mI)	ŞŲ	Retail Chickens	0.0%						465	0.0%			0.0%	0.0%		
		Chickens	HACCP	0.0%	0.0% 0		16.7% 1		0.0% 0	100.0% 1		0.0% 0	0.0% 0	0.0% 0	0.0% 0		
		ľ	Cecal														
			Retail Ground Turkey	100.0%	0.0% 0	0.0%	0.0%			0.0%	0.0%	0.0% 0		0.0%			
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
		ı,	Cecal	U	U	U	U	U	U	U	U	U	U	U	U		
		$\vdash$	Retail Ground Beef	0.0%	0.0%	50.0%				0.0%	0.0%	0.0%		0.0%			
		1.	HACCP	7.1%	0.0%	1 11.4%	25.9%	16.7%	13.3%	0 12.9%	0.0%	20.0%	7.7%	0.0%	15.4%		
		Cattle		8	0	5	7	5	4	4	0	1	1	0	0.0%		
		Ĭ	Cecal (Beef)												0.0%		
			Cecal (Dairy)	100.00/	0.09/										0.0%		
			Retail Pork Chops	100.0%	0.0%		0.001	0.001	0.001	0.001			0.051				
		Swine	HACCP		33.3% 1		0.0% 0	0.0%	0.0% 0	0.0%			0.0%				
		Š	Cecal (Market Hogs)												0.0% 0		
			Cecal (Sows)												0.0%		
<sup>1</sup> In 2012 and 2013, FSIS	did not sample products f	or Sal	Imonella because in prior	years the pe	rcent of por	k carcass s	amples pos	itive for Salr	nonella wa	s consistent	ly low						

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low <sup>2</sup> Sulfamethoxazole was tested from 1996-2003 and was replaced by sulfisoxazole in 2004

Table 50d. Antimicrobial Resistance among Salmonella Newport Isolates, 2002-2013    Year   2002   2003   2004   2005   2006   2007   2008   2009   2010   2011   2012														2042	
Year Number of Isolates Tes	ited		Humans	2002 244	2003 226	<b>2004</b> 192	<b>2005</b> 207	<b>2006</b> 219	<b>2007</b> 222	2008 258	<b>2009</b> 239	<b>2010</b> 306	2011 285	2012 258	<b>2013</b> 209
100		ens	Retail Chickens	2	0	0	0	0	0	0	1	0	0	1	2
		Chicker	HACCP Cecal	6	7	0	6	0	3	1	0	1	1	2	2 0
		_	Retail Ground Turkey	1	2	2	3	0	0	3	3	2	0	2	0
		Turkeys	HACCP	113	75	44	27	30	30	31	17	5	13	5	13
		-	Cecal	_											8
		ttle	Retail Ground Beef HACCP	3 113	1 75	2 44	0 27	0 30	0 30	3 31	2 17	2 5	0 13	1 5	0 13
		Cattle	Cecal (Beef)												8
		_	Cecal (Dairy)	-					0		0		0	0	7
		Swine	Retail Pork Chops HACCP <sup>1</sup>	2 0	3	0	0	0	0	0 2	0	0	0	0	0
		Ś	Cecal (Market Hogs)												3
	Antimicrobial		Cecal (Sows)												4
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
Macrolides	Azithromycin (MIC ≥32 µg/mI)		Humans										0.0%	0.0% 0	0.0%
	, , , , , ,	S	Retail Chickens											0.0%	0.0%
		Chickens	HACCP										0.0%	0.0%	0.0%
		ပ်	Cecal												
		<u> </u>	Retail Ground Turkey											0.0%	
		Turkeys	HACCP										0.0%	0.0%	0.0%
		12	Cecal										U	J	
			Retail Ground Beef											0.0%	
		a)	HACCP										0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)										0	0	0.0%
			Cecal (Dairy)												0.0%
			Retail Pork Chops												0
		0	HACCP										0.0%		
		Swine											0		0.0%
		0,	Cecal (Market Hogs)												0.0%
Penicillins	Ampicillin		Cecal (Sows)	24.6%	23.0%	16.1%	14.0%	15.5%	9.9%	14.3%	8.4%	7.8%	3.9%	7.0%	6.2%
rememins	(MIC ≥ 32 μg/ml)		Humans	60	52	31	29	34	22	37	20	24	11	18	13
		sus	Retail Chickens	0							0.0%			0	0
		Chickens	HACCP	16.7% 1	85.7% 6		50.0% 3		0.0% 0	100.0% 1		0.0% 0	0.0%	0.0% 0	0.0% 0
		0	Cecal												
		s	Retail Ground Turkey	100.0% 1	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%		50.0% 1	
		Turkeys	HACCP	0.0%	15.8% 3	28.6% 2	20.0%	75.0% 3	6.7% 1	25.0% 2	33.3% 1	20.0%	25.0% 1	25.0% 1	0.0%
			Cecal		-	_									
			Retail Ground Beef	66.7% 2	100.0% 1	100.0% 2				66.7% 2	0.0%	50.0% 1		0.0%	
		Ф	HACCP	78.8%	82.7%	81.8%	85.2%	80.0%	76.7%	74.2%	64.7%	60.0%	76.9%	60.0%	76.9%
		Cattle	Cecal (Beef)	89	62	36	23	24	23	23	11	3	10	3	75.0%
			Cecal (Dairy)												71.4%
			Retail Pork Chops	100.0%	100.0%										5
				2	1 100.0%		0.0%	0.0%	0.0%	50.0%			0.0%		
		Swine	HACCP		3		0.078	0.076	0.0%	1			0.078		33.3%
		S	Cecal (Market Hogs)												33.3% 1 0.0%
DI	Chlara		Cecal (Sows)	05.551	00.551	45.50	40.50	40.55	0.50:	40.00	7.55	7.50	0.551	0.001	0
Phenicols	Chloramphenicol (MIC ≥ 32 µg/ml)		Humans	25.0% 61	22.6% 51	15.6% 30	13.5% 28	12.8% 28	9.5% 21	12.0% 31	7.5% 18	7.5% 23	3.5% 10	3.9% 10	4.8% 10
		SL	Retail Chickens	0.0% 0							0.0%			0.0% 0	0.0% 0
		Chickens	HACCP	0.0%	85.7% 6		50.0% 3		0.0% 0	100.0% 1		0.0%	0.0%	0.0%	0.0%
		ਠਿੰ	Cecal												
			Retail Ground Turkey	100.0%	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%		0.0%	
		Turkeys	HACCP	0.0%	21.1%	14.3%	0.0%	0.0%	0.0%	12.5%	0.0%	0.0%	0.0%	25.0%	0.0%
		ī	Cecal	0	4	1	0	0	0	1	0	0	0	1	0
			Retail Ground Beef	66.7%	100.0%	100.0%				66.7%	0.0%	100.0%		0.0%	
				2 77.9%	1 78.7%	2 77.3%	81.5%	66.7%	76.7%	2 64.5%	0 52.9%	2 60.0%	76.9%	0 40.0%	69.2%
		Cattle	HACCP	88	59	34	22	20	23	20	9	3	10	2	9 75.0%
			Cecal (Beef)												6 71.4%
			Cecal (Dairy)	465	465										71.4% 5
			Retail Pork Chops	100.0% 2	100.0% 1										
		Swine	HACCP		100.0%		0.0%	0.0%	0.0%	50.0% 1			0.0%		
		Swi	Cecal (Market Hogs)												33.3% 1
			Cecal (Sows)												0.0%
1 1- 2042 1 2042 FDIC		for Col	Imonella because in prior	mara tha na				:::							

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 50e. Antimicrobial Resistance among Salmonella Newport Isolates, 2002-2013

Table 50e. Antimicro	bial Resistance amo	ong (	Salmonella Newport	Isolates,	2002-201	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ed		Humans	244	226	192	2005	219	222	258	239	306	285	258	2013
		Chickens	Retail Chickens HACCP Cecal	2 6	0 7	0 0	0 6	0	0	0	1 0	0 1	0	1 2	2 2 0
		Turkeys	Retail Ground Turkey HACCP Cecal	1 10	2 19	2 7	3 5	0 4	0 15	3 8	3	2 5	0 4	2 4	0 4 0
		Cattle	Retail Ground Beef HACCP Cecal (Beef) Cecal (Dairy)	3 113	1 75	2 44	0 27	0 30	0 30	3 31	2 17	2 5	0 13	1 5	0 13 8 7
		Swine	Retail Pork Chops HACCP <sup>1</sup> Cecal (Market Hogs) Cecal (Sows)	2 0	1 3	0	0 1	0	0	0 2	0	0	0	0	0 3 4
Antimicrobial Class	Antimicrobial (Resistance Breakpoint)		Isolate Source												
Quinolones	Ciprofloxacin (MIC ≥ 1 μg/mI)		Humans	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	( = 1 pg)	S	Retail Chickens	0.0%	-				-	-	0.0%	-	-	0.0%	0.0%
		Chickens	HACCP	0.0%	0.0%		0.0%		0.0%	0.0%		0.0%	0.0%	0.0%	0.0%
		ပ်	Cecal	- J			J			- ŭ			- J	J	
			Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%		0.0%	
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Ţ	Cecal	0	0	0	0	0	0	0	0	0	0	0	0
		$\vdash$	Retail Ground Beef	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%		0.0%	
				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	HACCP	0	0	0	0	0	0	0	0	0	0	0	0.0%
		1	Cecal (Beef)												0.0%
		_	Cecal (Dairy)	0.00/	0.00/										0.0%
			Retail Pork Chops	0.0% 0	0.0% 0										
		Swine	HACCP		0.0% 0		0.0% 0	0.0% 0	0.0%	0.0% 0			0.0% 0		
		Sw	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
	Nalidixic Acid (MIC ≥ 32 µg/mI)		Humans	0.8%	0.4% 1	0.5%	0.0%	0.9% 2	0.0%	0.4%	0.0% 0	0.3%	0.4% 1	0.0%	0.0%
	(WilC = 32 μg/III)		Retail Chickens	0.0%			U		U		0.0%	-		0.0%	0.0%
		Chickens	HACCP	0.0%	0.0%		0.0%		0.0%	0.0%	0	0.0%	0.0%	0.0%	0.0%
		ş	Cecal	0	0		0		0	0		0	0	0	0
		-	Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%		0.0%	
		eys		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Turkey	HACCP	0	0	0	0	0	0	0	0	0	0	0	0
		-	Cecal	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%		0.0%	
			Retail Ground Beef	0.0%	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	HACCP	0.0%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0
		Ü	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0% 0
			Retail Pork Chops	0.0%	0.0%										
		ne	HACCP		0.0% 0		0.0%	0.0% 0	0.0%	0.0%			0.0%		
		Swine	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
Tetracyclines	Tetracycline (MIC ≥ 16 μg/mI)	1	Humans	25.4% 62	24.3% 55	17.2% 33	14.5% 30	14.6% 32	9.9% 22	14.0% 36	8.8% 21	8.5% 26	4.6% 13	4.3% 11	6.2%
	(wice to haliti)	<u> </u>	Retail Chickens	100.0%	33	33	30	32	22	30	0.0%	20	13	0.0%	0.0%
		Chickens	HACCP	0.0%	85.7%		50.0%		0.0%	100.0%	0	0.0%	0.0%	0.0%	0.0%
		Chic	Cecal	0	6		3		0	1		0	0	0	0
		$\vdash$	Retail Ground Turkey	100.0%	0.0%	0.0%	0.0%			66.7%	0.0%	0.0%		50.0%	
		s/s	· · · · · · · · · · · · · · · · · · ·	1 40.0%	0 36.8%	28.6%	0 60.0%	25.0%	20.0%	2 62.5%	0 33.3%	0.0%	50.0%	1 50.0%	0.0%
		Turkeys	HACCP	4	7	2	3	1	3	5	1	0.070	2	2	0
			Cecal	66 70/	100.00/	100.00/				66 70/	0.00/	100.00/		0.00/	
			Retail Ground Beef	66.7%	100.0%	100.0%				66.7%	0.0%	100.0%		0.0%	
		Cattle	HACCP	80.5% 91	84.0% 63	84.1% 37	81.5% 22	83.3% 25	86.7% 26	74.2% 23	70.6% 12	60.0% 3	76.9% 10	80.0% 4	76.9% 10
		S	Cecal (Beef)												75.0% 6
			Cecal (Dairy)												71.4% 5
			Retail Pork Chops	100.0%	100.0%										
		Эē	HACCP		100.0%		0.0%	0.0%	0.0%	50.0%			100.0%		
		Swine	Cecal (Market Hogs)		3		0	0	0	1			1		66.7%
			Cecal (Sows)												25.0%
11, 0040, 10040, 5010	 	or Sal	Imonella because in prior	ears the ne	rcent of por	k carcase e	amnles nos	itive for Sale	nonolla was	consistent	ly low				1

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 51a. Resistance Patte	erns	among Salmoneli	a Newpor	t Isolates	, 2002-201	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	244	226	192	207	219	222	258	239	306	285	258	209
	kens	Retail Chickens	2	0	0	0	0	0	0	1	0	0	1	2
	Chickens	HACCP Cecal	6	7	0	6	0	3	1	0	1	1	2	2
		Retail Ground Turkey	1	2	2	3	0	0	3	3	2	0	2	0
	Turkeys	HACCP Cecal	10	19	7	5	4	15	8	3	5	4	4	4
		Retail Ground Beef	3	1	2	0	0	0	3	2	2	0	1	0
	Cattle	HACCP	113	75	44	27	30	30	31	17	5	13	5	13
	0	Cecal (Beef) Cecal (Dairy)												8 7
		Retail Pork Chops	2	1	0	0	0	0	0	0	0	0	0	0
	Swine	HACCP <sup>2</sup> Cecal (Market Hogs)	0	3	0	1	1	1	2	0	0	1		3
		Cecal (Sows)												4
Resistance Pattern		Source Humans	72.5%	73.5%	81.8%	84.1%	82.2%	89.2%	85.3%	89.1%	90.5%	94.4%	93.0%	91.9%
1. No Resistance Detected	<u> </u>	I	177 0.0%	166	157	174	180	198	220	213 100.0%	277	269	240 100.0%	192 100.0%
	ens	Retail Chickens	0 83.3%	14.3%		50.0%		100.0%	0.0%	1	100.0%	100.0%	1 100.0%	2 100.0%
	Chickens	HACCP	5	14.5%		30.0%		3	0.0 %		1	1	2	2
		Cecal												
	۱	Retail Ground Turkey	0.0%	50.0% 1	100.0%	100.0%			0.0%	66.7% 2	50.0% 1		50.0% 1	
	Turkeys	HACCP	60.0%	21.1%	57.1% 4	20.0%	25.0% 1	80.0%	12.5%	0.0%	80.0% 4	50.0%	50.0% 2	100.0% 4
	Ĕ	Cecal	6	-			'	12		U	_	2		_
	H	Retail Ground Beef	33.3%	0.0%	0.0%				33.3%	100.0%	0.0%		100.0%	
			2 19.5%	0 14.7%	0 15.9%	14.8%	16.7%	13.3%	1 25.8%	29.4%	0 40.0%	23.1%	1 20.0%	23.1%
	Cattle	HACCP	22	11	7	4	5	4	8	5	2	3	1	3 25.0%
	ľ	Cecal (Beef)												2
	L	Cecal (Dairy)												28.6% 2
		Retail Pork Chops	0.0%	0.0%										
	e e	HACCP		0.0%		100.0% 1	100.0%	100.0%	50.0% 1			0.0%		
	Swine	Cecal (Market Hogs)		U		,	1	1				0		33.3%
		Cecal (Sows)												75.0%
			25.0%	23.5%	16.7%	14.5%	15.5%	10.8%	13.6%	8.4%	7.8%	3.9%	6.2%	3 5.7%
2. Resistant to ≥ 3 Antimicrobial Classes	<u> </u>	Humans	61 0.0%	53	32	30	34	24	35	20 0.0%	24	11	16 0.0%	12 0.0%
Antimicrobial Classes	SE .	Retail Chickens	0							0.0 %			0	0
	Chickens	HACCP	0.0% 0	85.7% 6		50.0% 3		0.0%	100.0% 1		0.0%	0.0%	0.0% 0	0.0%
		Cecal												
		Retail Ground Turkey	100.0%	0.0%	0.0%	0.0% 0			0.0%	0.0% 0	0.0%		50.0% 1	
	Turkeys	HACCP	0.0%	26.3%	14.3%	80.0%	75.0%	6.7%	37.5%	33.3%	20.0%	25.0%	25.0%	0.0%
	2	Cecal	0	5	1	4	3	1	3	1	1	1	1	0
	<u> </u>	Retail Ground Beef	66.7%	100.0%	100.0%				66.7%	0.0%	100.0%		0.0%	
			2 80.5%	1 84.0%	2 84.1%	81.5%	83.3%	83.3%	2 74.2%	70.6%	2 60.0%	76.9%	0 80.0%	76.9%
	attle	HACCP	91	63	37	22	25	25	23	12	3	10	4	10
	ľ	Cecal (Beef)												75.0% 6
		Cecal (Dairy)												71.4% 5
		Retail Pork Chops	100.0%	100.0% 1										
	ЭС	HACCP		100.0%		0.0%	0.0%	0.0%	50.0% 1			0.0%		
	Swine	Cecal (Market Hogs)												33.3%
		Cecal (Sows)												0.0%
		Humans	25.0%	23.0%	16.1%	14.0%	13.7%	9.5%	13.6%	7.5%	7.8%	3.9%	3.9%	0 4.8%
3. Resistant to ≥ 4 Antimicrobial Classes	┡	1	61 0.0%	52	31	29	30	21	35	18 0.0%	24	11	10 0.0%	10 0.0%
	3US	Retail Chickens	0	05 70/		E0.001		0.004	100.004	0.0%	0.007	0.004	0	0
	Chickens	HACCP	0.0% 0	85.7% 6		50.0% 3		0.0%	100.0% 1		0.0%	0.0%	0.0%	0.0% 0
	Ĺ	Cecal												
		Retail Ground Turkey	100.0%	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%		50.0% 1	
	Turkeys	HACCP	0.0%	21.1%	14.3%	0.0%	25.0%	6.7%	25.0%	33.3%	20.0%	25.0%	25.0%	0.0%
	Ļ	Cecal	0	4	1	0	1	1	2	1	1	1	1	0
	<u> </u>	Retail Ground Beef	66.7%	100.0%	100.0%				66.7%	0.0%	100.0%		0.0%	
			2 80.5%	1 84.0%	2 84.1%	81.5%	83.3%	83.3%	2 74.2%	70.6%	2 60.0%	76.9%	0 80.0%	76.9%
	Cattle	HACCP	91	63	37	22	25	25	23	12	3	10	4	10
	J	Cecal (Beef)												75.0% 6
	L	Cecal (Dairy)												71.4% 5
		Retail Pork Chops	100.0% 2	100.0%										
	ē	HACCP		100.0%		0.0%	0.0%	0.0%	50.0%			0.0%		
	Swine	Cecal (Market Hogs)		3		0	0	0	1			0		33.3%
	1	,												1
		Cecal (Sows)												0.0%

<sup>1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

<sup>2</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

Table 51b. Resistance Patterns among Salmonella Newport Isolates, 2002-2013<sup>1</sup>

Table 51b. Resistance Patte	erns	among Salmonel		rt Isolates	, 2002-201	3'								
Year		Diverses	2002 244	<b>2003</b> 226	<b>2004</b> 192	<b>2005</b> 207	<b>2006</b> 219	<b>2007</b> 222	2008 258	<b>2009</b> 239	<b>2010</b> 306	<b>2011</b> 285	<b>2012</b> 258	<b>2013</b> 209
Number of Isolates Tested		Humans												
	Chickens	Retail Chickens HACCP	2 6	0 7	0	0 6	0	0	0	1 0	0	0	1 2	2 2
	Chi	Cecal												0
	ski	Retail Ground Turkey	1	2	2	3	0	0	3	3	2	0	2	0
	Turkeys	HACCP	10	19	7	5	4	15	8	3	5	4	4	4 0
	Ė	Cecal	3	1	2	0	0	0	3	2	2	0	1	0
	ale He	Retail Ground Beef HACCP	113	75	44	27	30	30	31	17	5	13	5	13
	Cattle	Cecal (Beef)												8
		Cecal (Dairy)												7
	۵	Retail Pork Chops	2	1	0	0	0	0	0	0	0	0	0	0
	Swine	HACCP <sup>2</sup> Cecal (Market Hogs)	0	3	0	1	1	1	2	0	0	1	0	3
		Cecal (Sows)												4
Resistance Pattern		Source	23.4%	22.6%	15.1%	12.6%	13.2%	8.6%	12.8%	7.1%	7.5%	3.5%	3.9%	4.8%
4. Resistant to ≥ 5		Humans	57	51	29	26	29	19	33	17	23	10	10	10
Antimicrobial Classes	St	Retail Chickens	0.0%							0.0% 0			0.0%	0.0% 0
	Chickens	HACCP	0.0%	85.7% 6		50.0% 3		0.0%	100.0% 1		0.0%	0.0%	0.0%	0.0%
	ວົ	Cecal				- J					Ü			, and the second
			100.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	
	sk	Retail Ground Turkey	0	0	0	0	25.00/	0	0	0	4	0	1	0.00/
	Turkeys	HACCP	0.0%	10.5% 2	14.3% 1	0.0% 0	25.0% 1	6.7% 1	12.5% 1	33.3% 1	0.0% 0	25.0% 1	25.0% 80	0.0% 0
	ľ	Cecal												
		Retail Ground Beef	66.7%	100.0%	100.0%				66.7%	0.0%	50.0%		0.0%	
	_	HACCP	2 78.8%	1 81.3%	2 79.5%	81.5%	76.7%	76.7%	2 64.5%	0 58.8%	1 60.0%	76.9%	0 40.0%	76.9%
	Cattle		89	61	35	22	23	23	20	10	3	10	2	10 75.0%
	ľ	Cecal (Beef)												6
		Cecal (Dairy)												71.4% 5
		Retail Pork Chops	100.0%	100.0%										
		HACCP	1	100.0%		0.0%	0.0%	0.0%	50.0%			0.0%		
	Swine			3		0	0	0	1			0		33.3%
	0,	Cecal (Market Hogs)												1
		Cecal (Sows)												0.0% 0
5. At Least ACSSuT <sup>3</sup> Resistant		Humans	23.4% 57	22.1% 50	15.1% 29	12.6% 26	12.3% 27	8.6% 19	11.6% 30	7.1% 17	7.5% 23	3.5% 10	3.9% 10	4.8% 10
S. At Least Account Resistant	_	Retail Chickens	0.0%	30	2.9	20	21	19	30	0.0%	23	10	0.0%	0.0%
	ens		0.0%	71.4%		50.0%		0.0%	100.0%	0	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0	5		3		0	1		0	0	0	0
		Cecal												
		Retail Ground Turkey	100.0%	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%		0.0%	
	Turkeys	HACCP	0.0%	5.3%	14.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%
	₽	Cecal	0	1	1	0	0	0	0	0	0	0	1	0
	_		66.7%	100.0%	100.0%				66.7%	0.0%	50.0%		0.0%	
		Retail Ground Beef	2	1	2				2	0	1		0	
	£ £	HACCP	70.8% 80	66.7% 50	75.0% 33	81.5% 22	63.3% 19	70.0% 21	64.5% 20	47.1% 8	60.0% 3	76.9% 10	20.0%	69.2% 9
	Cattle	Cecal (Beef)									-			75.0%
		Cecal (Dairy)												71.4%
	<b> </b>		100.0%	100.0%										5
		Retail Pork Chops	2	1		2.55	2.22							
	ie.	HACCP		100.0% 3		0.0%	0.0%	0.0%	50.0% 1			0.0%		
	Swine	Cecal (Market Hogs)												33.3% 1
		Cecal (Sows)												0.0%
	-		3.7%	1.3%	1.0%	1.9%	2.7%	0.5%	2.7%	1.3%	1.3%	0.0%	0.4%	0.5%
6. At Least ACT/S <sup>4</sup> Resistant	<u> </u>	Humans	9	3	2	4	6	1	7	3	4	0.076	1	1
	SL	Retail Chickens	0.0% 0							0.0% 0			0.0% 0	0.0% 0
	Chickens	HACCP	0.0%	0.0%		16.7% 1		0.0%	100.0% 1		0.0%	0.0% 0	0.0%	0.0% 0
	ర్	Cecal						Ů						
	$\vdash$		100.0%	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%		0.0%	
	ski	Retail Ground Turkey	1 0.0%	0.0%	0 14.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Turkeys	HACCP	0.0%	0.0%	14.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	٦٠	Cecal												
		Retail Ground Beef	0.0%	0.0%	50.0%				0.0%	0.0%	0.0%		0.0%	
		HACCP	0 7.1%	0.0%	2.3%	25.9%	10.0%	13.3%	0 12.9%	0.0%	20.0%	7.7%	0.0%	15.4%
	Cattle		8	0	1	7	3	4	4	0	1	1	0	2 0.0%
	٦	Cecal (Beef)												0
		Cecal (Dairy)												0.0% 0
		Retail Pork Chops	100.0%	0.0%										
		HACCP	2	33.3%		0.0%	0.0%	0.0%	0.0%			0.0%		
	Swine			1		0	0	0	0			0		0.0%
	S	Cecal (Market Hogs)												0
		Cecal (Sows)												0.0% 0
1 Starting in 2011, testing included	nine a	entimicrobial classes w	ith the addition	on of the ma	crolide azithr	omycin. Bec	ause resista	nce to azithr	omycin is low	(in this case	e. <1%), antii	microbial cla	ss resistance	

1 Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

ACSSuT = ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline

4ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole

Table 51c. Resistance Patte	erns	among Salmoneli												
Year			2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested	Chickens	Humans  Retail Chickens  HACCP	244 2 6	226 0 7	192 0 0	207 0 6	219 0 0	222 0 3	258 0 1	239 1 0	306 0 1	285 0 1	258 1 2	209 2 2
	Turkeys Ch	Cecal  Retail Ground Turkey  HACCP  Cecal	1 10	2 19	2 7	3 5	0 4	0 15	3 8	3 3	2 5	0 4	2 4	0 0 4 0
	Cattle	Retail Ground Beef HACCP Cecal (Beef) Cecal (Dairy)	3 113	1 75	2 44	0 27	0	0 30	3 31	2 17	2 5	0 13	1 5	0 13 8 7
	Swine	Retail Pork Chops HACCP <sup>1</sup> Cecal (Market Hogs) Cecal (Sows)	2	1 3	0	0 1	0	0 1	0 2	0	0	0	0	0 3 4
Resistance Pattern	1	Source	22.5%	21.2%	15.1%	12.6%	11.0%	8.1%	11.6%	7.1%	7.5%	3.5%	3.9%	4.8%
7. At Least ACSSuTAuCx <sup>2</sup> Resistant	_	Humans  Retail Chickens	55 0.0% 0	48	29	26	24	18	30	17 0.0% 0	23	10	10 0.0% 0	10 0.0% 0
	Chickens	HACCP	0.0%	71.4% 5		50.0%		0.0%	100.0%	U	0.0%	0.0%	0.0%	0.0%
		Cecal												
	S/	Retail Ground Turkey	100.0% 1	0.0% 0	0.0% 0	0.0% 0				0.0%	0.0%		0.0%	
	Turkeys	HACCP	0.0%	5.2% 1	14.3% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cecal												
		Retail Ground Beef	66.7% 2	100.0% 1	100.0%				66.7% 2	0.0%	50.0% 1		0.0%	
	Cattle	HACCP	70.8% 80	66.7% 50	72.7% 32	81.5% 22	63.3% 19	70.0% 21	64.5% 20	47.1% 8	60.0%	76.9% 10	20.0%	69.2% 9 75.0%
		Cecal (Beef)												6
	_	Cecal (Dairy)	100.0%	100.0%										71.4% 5
		Retail Pork Chops  HACCP	2	1 100.0%		0.0%	0.0%	0.0%	50.0%			0.0%		
	Swine	Cecal (Market Hogs)		3		0	0	0	1			0		33.3%
		Cecal (Sows)												0.0%
8. At Least Ceftriaxone and		Humans	0.4%	0.0%	0.5%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%
Nalidixic Acid Resistant		Retail Chickens	0.0%							0.0%			0.0%	0.0%
	Chickens	HACCP	0.0%	0.0%		0.0%		0.0%	0.0%		0.0%	0.0%	0.0%	0.0%
	Ę	Cecal	0	0		0		0	0		0	0	0	0
		Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%				0.0%	0.0%		0.0%	
	Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0
		Cecal												
		Retail Ground Beef	0.0% 0 0.0%	0.0% 0 1.3%	0.0% 0 0.0%	0.0%	0.0%	0.0%	0.0% 0 0.0%	0.0% 0 0.0%	0.0% 0 0.0%	0.0%	0.0% 0 0.0%	0.0%
	Cattle	HACCP	0.0%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0
	O	Cecal (Beef)												0.0%
		Cecal (Dairy)	0.0%	0.0%										0.0%
		Retail Pork Chops	0.0%	0										
	Swine	HACCP		0.0%		0.0%	0.0%	0.0%	0.0%			0.0%		0.0%
	0)	Cecal (Market Hogs)												0
		Cecal (Sows)												0.0% 0

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low <sup>2</sup> ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

Table 52a. Antimicrobial Resistance among Salmonella 1 4,[5],12:i:- Isolates, 2002-2013

ear			Humans	<b>2002</b> 35	<b>2003</b> 36	<b>2004</b> 36	<b>2005</b> 33	<b>2006</b> 105	<b>2007</b> 73	<b>2008</b> 84	<b>2009</b> 72	<b>2010</b> 78	<b>2011</b> 82	<b>2012</b> 117	<b>2013</b> 127
umber of Isolates Tes	sted	2													
		Chicken	Retail Chickens HACCP Cecal	5 N/A <sup>1</sup>	2 N/A	4 44	9 102	9 79	2 49	4 29	8 21	2 17	6	6 17	3 21 0
		Turkeys	Retail Ground Turkey HACCP	2 N/A	0 N/A	0 4	0 2	2 3	0 6	0 1	0	0	0 2	0	6
		Cattle	Retail Ground Beef HACCP Cecal (Beef)	0 N/A	0 N/A	0 4	0 2	0	2	0	0	0	0 2	0	0 0 5 0
		Swine	Cecal (Dairy)  Retail Pork Chops  HACCP <sup>2</sup> Cecal (Market Hogs)	0 N/A	0 N/A	0	0	0 2	0	0	0	0	0 2	0	1 2
	Antimicrobial (Resistance		Cecal (Sows)												3
ntimicrobial Class	Breakpoint)		Source	0.0%	5.6%	5.6%	0.0%	4.8%	1.4%	3.6%	2.8%	1.3%	2.4%	2.6%	4.7%
minoglycosides	Gentamicin (MIC ≥ 16 μg/ml)		Humans	0	2	2	0	5	1	3	2	1	2.4%	3	6
		sus	Retail Chickens	0.0% 0	0.0% 0	0.0% 0	11.1% 1	22.2% 2	50.0% 1	0.0% 0	12.5% 1	0.0% 0		0.0% 0	0.0% 0
		Chickens	HACCP			11.4% 5	9.8% 10	11.4% 9	0.0%	6.9% 2	4.8% 1	23.5% 4	16.7% 1	17.6% 3	9.5% 2
		O	Cecal												
			Retail Ground Turkey	0.0%				50.0% 1							0.0% 0
		Turkeys	HACCP			100.0%	0.0%	100.0%	100.0%				0.0%	0.0%	16.7%
		2	Cecal				U		-				U	0	
		-	Retail Ground Beef						50.0%						
			HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)			0	0	0	0	0	0		0	0	0
															0.0%
			Cecal (Dairy)												0.0%
			Retail Pork Chops				0.00/	0.00/	0.00/	0.00/	0.00/	400.00/	0.00/		0.070
		Swine	HACCP				0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	100.0% 1	0.0% 0		
		Ø	Cecal (Market Hogs)												0.0% 0
			Cecal (Sows)												0.0% 0
	Kanamycin (MIC ≥ 64 μg/ml)		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	1.4% 1	1.2% 1	0.0%	1.3%	0.0%	0.0%	0.8%
	(WIIO E OF pg/III)		Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		33.3%	0.0%
		Chickens	HACCP	0	0	4.5%	0.0%	0.0%	4.1%	0.0%	0.0%	11.8%	0.0%	0.0%	4.8%
		Ŗ	Cecal			2	0	0	2	0	0	2	0	0	1
			Retail Ground Turkey	0.0%				0.0%							0.0%
		eys	-	0		0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%
		Turkeys	HACCP			0	0	0	0				0	0	0
			Cecal						0.00/						
			Retail Ground Beef						0.0%						
		Cattle	HACCP			0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0% 0		0.0% 0	33.3% 1	0.0% 0
		ర	Cecal (Beef)												
			Cecal (Dairy)												0.0%
			Retail Pork Chops												0.0%
		e e	HACCP				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		Ť
		Swine	Cecal (Market Hogs)				0	U	U	3	U	U	U		0.0%
			Cecal (Sows)												0.0%
	Streptomycin	+	Humans	2.9%	8.3%	5.6%	3.0%	3.8%	8.2%	10.7%	12.5%	19.2%	24.4%	29.1%	53.5%
	(MIC ≥ 64 μg/ml)	$\vdash$	Retail Chickens	0.0%	0.0%	0.0%	1 11.1%	4 22.2%	6 0.0%	9 0.0%	9 12.5%	15 0.0%	20	34 0.0%	68 0.0%
		cens		0	0	0 15.9%	1 9.8%	6.3%	0 8.2%	0 10.3%	1 9.5%	0 11.8%	16.7%	0 17.6%	0 14.3%
		Chickens	HACCP			7	10	5	4	3	2	2	1	3	3
			Cecal	0.0%				50.0%							100.00
		ys	Retail Ground Turkey	0.0%		400.007	50.007	1	400.007				0.007	400.000	100.09
		Turkeys	HACCP			100.0% 1	50.0% 1	100.0% 1	100.0% 1				0.0%	100.0% 1	100.09
			Cecal												
			Retail Ground Beef						0.0%						
		<u>a</u>	HACCP			25.0% 1	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	66.7% 2	100.09
		Cattle	Cecal (Beef)				0	U	0	,	J		0		,
			Cecal (Dairy)												100.09
		-	Retail Pork Chops												0.0%
							100.0%	0.0%	0.0%	100.0%	0.0%	100.0%	100.0%		0
		Swine	HACCP				1	0.078	0.076	1	0.076	1	2		75.0%
		Ś	Cecal (Market Hogs)												3
			Cecal (Sows)												66.7% 2

<sup>&</sup>lt;sup>1</sup> N/A = data not available. Antigenic formulas for monophasic Salmonella were not determined for food animal isolates prior to 2004

<sup>&</sup>lt;sup>2</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 52b. Antimicrobial Resistance among Salmonella 1 4,[5],12:i:- Isolates, 2002-2013

Year Number of Isolates Teste	ed	ens	Humans Retail Chickens	<b>2002</b> 35	<b>2003</b> 36	<b>2004</b> 36	<b>2005</b> 33	<b>2006</b> 105	<b>2007</b> 73	<b>2008</b> 84	<b>2009</b> 72	<b>2010</b> 78	<b>2011</b> 82	<b>2012</b> 117	<b>2013</b> 127
		ens	Betail Chieleana												127
		V		5	2	4	9	9	2	4	8	2	0	6	3
		Chick	HACCP Cecal	N/A <sup>1</sup>	N/A	44	102	79	49	29	21	17	6	17	21 0
		sks	Retail Ground Turkey	2	0	0	0	2	0	0	0	0	0	0	6
		Turke	HACCP	N/A	N/A	4	2	3	6	1	1	0	2	1	6
		Ė	Cecal Retail Ground Beef	0	0	0	0	0	2	0	0	0	0	0	0
		Cattle	HACCP	N/A	N/A	4	2	3	6	1	1	0	2	3	5
		ပိ	Cecal (Beef) Cecal (Dairy)												0
		_	Retail Pork Chops	0	0	0	0	0	0	0	0	0	0	0	1 2
		Swine	HACCP <sup>2</sup>	N/A	N/A	0	1	2	1	1	1	1	2	ŭ	
		6	Cecal (Market Hogs) Cecal (Sows)												4 3
	Antimicrobial		Isolate												
Antimicrobial Class	(Resistance Breakpoint)		Source												
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin- Clavulanic Acid		Humans	2.9% 1	5.6% 2	2.8% 1	3.0% 1	3.8% 4	1.4% 1	4.8% 4	4.2% 3	3.8%	3.7% 3	1.7% 2	1.6% 2
	(MIC ≥ 32 / 16 µg/ml)	SI	Retail Chickens	0.0%	0.0%	0.0%	0.0%	11.1% 1	0.0%	0.0%	0.0%	0.0%		33.3% 2	0.0%
		Chickens	HACCP			4.5% 2	5.9% 6	16.5% 13	16.3% 8	3.4%	9.5% 2	0.0%	16.7% 1	11.8% 2	4.8% 1
		Ò	Cecal			_	-				_			_	
			Retail Ground Turkey	0.0%				0.0%							0.0%
		Turkeys	HACCP	U		0.0%	50.0%	0.0%	0.0%				0.0%	0.0%	0.0%
		Ţ	Cecal			0	1	0	0				0	0	0
			Retail Ground Beef						0.0%						
		_	HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		50.0%	0.0%	0.0%
		Cattle	Cecal (Beef)			0	0	0	0	0	0		1	0	0
															0.0%
			Cecal (Dairy)												0.0%
			Retail Pork Chops				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.076
		Swine	HACCP				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.00/
		Ś	Cecal (Market Hogs)												0.0% 0
			Cecal (Sows)												0.0% 0
Cephems	Cefoxitin (MIC ≥ 32 µg/mI)		Humans	2.9% 1	5.6% 2	2.8% 1	3.0% 1	3.8% 4	2.7% 1	4.8% 4	2.8%	2.6%	3.7% 4	0.9% 1	1.6% 2
		SI	Retail Chickens	0.0%	0.0%	0.0%	0.0%	11.1% 1	0.0%	0.0%	0.0%	0.0%		33.3% 2	0.0%
		Chickens	HACCP			4.5% 2	5.9% 6	16.5% 13	16.3% 8	3.4% 1	4.8% 1	0.0%	16.7% 1	11.8% 2	4.8% 1
		Ò	Cecal				-					,		_	
			Retail Ground Turkey	0.0%				0.0%							0.0%
		Turkeys	HACCP	U		0.0%	50.0%	0.0%	0.0%				0.0%	0.0%	0.0%
		₽	Cecal			0	1	0	0				0	0	0
			Retail Ground Beef						0.0%						
			HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		50.0%	0.0%	0.0%
		Cattle	Cecal (Beef)			0	0	0	0	0	0		1	0	0
															0.0%
			Cecal (Dairy)												0.0%
			Retail Pork Chops				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.076
		Swine	HACCP				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.00/
		Ø	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0% 0
	Ceftiofur (MIC ≥ 8 µg/ml)		Humans	2.9% 1	5.6% 2	2.8% 1	3.0% 1	3.8% 4	2.7% 2	4.8% 4	2.8%	2.6% 2	3.7% 3	0.9% 1	1.6% 2
		SL	Retail Chickens	0.0%	0.0% 0	0.0% 0	0.0%	11.1% 1	0.0%	0.0%	0.0%	0.0%		33.3% 2	0.0%
		Chickens	HACCP			4.5% 2	5.9% 6	16.5% 13	16.3% 8	3.4% 1	9.5% 2	0.0% 0	16.7% 1	11.8% 2	4.8% 1
		Ö	Cecal												
		-	Retail Ground Turkey	0.0%				0.0%							0.0%
		Turkeys	HACCP	U		0.0%	50.0%	0.0%	0.0%				0.0%	0.0%	0.0%
		₽	Cecal			U		U	U				U	U	U
			Retail Ground Beef						0.0%						
		•	HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		50.0%	0.0%	0.0%
		Cattle	Cecal (Beef)			0	0	0	0	0	0		1	0	0
															0.0%
		<u> </u>	Cecal (Dairy)												0.0%
			Retail Pork Chops				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.078
		Swine	HACCP				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.007
		Ó	Cecal (Market Hogs)												0.0%
															0.0%

<sup>&</sup>lt;sup>2</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 52c. Antimicro	Mid Nesistance dill	ong c		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ed	(0.	Humans	35	36	36	33	105	73	84	72	78	82	117	127
		Chickens	Retail Chickens HACCP Cecal	5 N/A <sup>1</sup>	2 N/A	4 44	9 102	9 79	2 49	4 29	8 21	2 17	6	6 17	3 21 0
		Turkeys	Retail Ground Turkey HACCP	2 N/A	0 N/A	0 4	0 2	2 3	0 6	0 1	0 1	0	0 2	0 1	6 6 0
		Cattle	Retail Ground Beef HACCP Cecal (Beef)	0 N/A	0 N/A	0 4	0 2	0	2 6	0 1	0	0	0 2	0	0 5 0
			Cecal (Dairy)  Retail Pork Chops	0	0	0	0	0	0	0	0	0	0	0	1 2
		Swine	HACCP <sup>2</sup> Cecal (Market Hogs) Cecal (Sows)	N/A	N/A	0	1	2	1	1	1	1	2		4 3
Antimicrobial Class	Antimicrobial (Resistance Breakpoint)		Isolate Source												
Cephems	Ceftriaxone (MIC ≥ 4 µg/mI)		Humans	2.9% 1	5.6% 2	2.8% 1	3.0% 1	3.8% 4	2.7%	4.8% 4	2.8%	2.6%	3.7% 3	0.9% 1	1.6%
	(	s	Retail Chickens	0.0%	0.0%	0.0%	0.0%	11.1%	0.0%	0.0%	0.0%	0.0%	_	33.3%	0.0%
		Chickens	HACCP		Ů	4.5% 2	5.9% 6	16.5% 13	16.3% 8	3.4%	9.5% 2	0.0%	16.7% 1	11.8% 2	4.8%
		ਠੰ	Cecal				0	13	0			0			
			Retail Ground Turkey	0.0%				0.0%							0.0%
		Turkeys	HACCP	0		0.0%	50.0%	0.0%	0.0%				0.0%	0.0%	0.0%
		Tu'T				0	1	0	0				0	0	0
		-	Cecal						0.0%						
			Retail Ground Beef			0.00/	0.00/	0.00/	0	0.00/	0.00/		50.00/	0.00/	0.00/
		Cattle	HACCP			0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0		50.0% 1	0.0% 0	0.0% 0
		Ö	Cecal (Beef)												
			Cecal (Dairy)												0.0% 0
			Retail Pork Chops												0.0%
		e	HACCP				0.0%	0.0%	0.0%	0.0%	0.0% 0	0.0% 0	0.0% 0		
		Swine	Cecal (Market Hogs)				0	0		0	0	0	0		0.0%
			Cecal (Sows)												0.0%
Folate Pathway Inhibitor	Sulfamethoxazole/		Humans	2.9%	5.6%	11.1%	0.0%	8.6%	4.1%	13.1%	13.9%	19.2%	23.2%	29.1%	53.5%
	Sulfisoxazole <sup>3</sup> (MIC ≥ 512 µg/mI)	-	1	0.0%	0.0%	4 0.0%	0 11.1%	9 22.2%	3 50.0%	11 0.0%	10 25.0%	15 0.0%	19	34 33.3%	68
	, , ,	ens	Retail Chickens	0	0	0 13.6%	1 9.8%	2 13.9%	1 6.1%	0 6.9%	2 9.5%	0 29.4%	33.3%	2 17.6%	0 14.3%
		Chickens	HACCP			6	10	11	3	2	2	5	2	3	3
			Cecal	0.00/				50.00/							400.00/
		s/	Retail Ground Turkey	0.0% 0				50.0% 1							100.0% 6
		Turkeys	HACCP			100.0% 1	50.0% 1	100.0% 1	100.0% 1				0.0% 0	100.0% 1	83.3% 5
			Cecal												
			Retail Ground Beef						50.0% 1						
		0	HACCP			0.0% 0	0.0% 0	0.0%	0.0%	0.0%	0.0%		0.0%	66.7% 2	100.0% 5
		Cattle	Cecal (Beef)			Ů	U	0	U	0	U		0	2	5
			Cecal (Dairy)												100.0%
		-	Retail Pork Chops												100.0%
			,				100.0%	50.0%	0.0%	100.0%	0.0%	100.0%	100.0%		2
		Swine	HACCP				1	1	0.070	1	0.070	1	2		75.0%
		S	Cecal (Market Hogs)												3
	Tring other		Cecal (Sows)	0.00:	0.00	0.00:	0.05:	0.05:	4 ***	4.00:	4.45:	4.00:	4.00:	0.05:	66.7%
	Trimethoprim- Sulfamethoxazole		Humans	2.9% 1	0.0% 0	2.8% 1	0.0%	0.0%	1.4% 1	4.8% 4	1.4% 1	1.3% 1	1.2% 1	0.0% 0	2.4%
	(MIC ≥ 4 / 76 μg/ml)	St	Retail Chickens	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0		0.0% 0	0.0% 0
		Chickens	HACCP			4.5% 2	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%
		Ö	Cecal												
			Retail Ground Turkey	0.0%				0.0%							0.0%
		Turkeys	HACCP			0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%
		ī	Cecal			0	0	0	0				0	0	0
		-	Retail Ground Beef						0.0%						
						0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
		Cattle	HACCP			0.076	0.070	0.070	0.070	0.070	0.070		0.070	0.070	0
		٥	Cecal (Beef)												0.007
			Cecal (Dairy)												0.0%
			Retail Pork Chops					<u></u>							0.0%
		Swine	HACCP				0.0% 0	0.0%	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0		
		Š	Cecal (Market Hogs)												0.0% 0
			Cecal (Sows)												0.0%
N/A - data not available	Antigonic formulae for mo	nonha	Isic Salmonella were not	determined	for food ani	mal isolates	prior to 200	4							U

<sup>&</sup>lt;sup>1</sup> N/A = data not available. Antigenic formulas for monophasic Salmonella were not determined for food animal isolates prior to 2004

<sup>&</sup>lt;sup>2</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

<sup>&</sup>lt;sup>3</sup> Sulfamethoxazole was tested from 1996-2003 and was replaced by sulfisoxazole in 2004

Table 52d. Antimicro	bial Resistance amo	ong (	Salmonella I 4,[5],12	2:i:- Isola 2002	tes, 2002	-2013 2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ed		Humans	35	36	36	33	105	73	84	72	78	82	117	127
		Chickens	Retail Chickens HACCP Cecal	5 N/A <sup>1</sup>	2 N/A	4 44	9 102	9 79	2 49	4 29	8 21	2 17	0 6	6 17	3 21 0
		Turkeys	Retail Ground Turkey HACCP	2 N/A	0 N/A	0 4	0 2	2 3	0	0	0 1	0	0 2	0 3	6 5
		Cattle	Retail Ground Beef HACCP Cecal (Beef)	0 N/A	0 N/A	0 4	0 2	0	2	0	0 1	0	0 2	0 3	0 0 5 0
		Swine	Cecal (Dairy)  Retail Pork Chops  HACCP <sup>2</sup> Cecal (Market Hogs)  Cecal (Sows)	0 N/A	0 N/A	0	0 1	0 2	0	0	0 1	0 1	0 2	0	1 2 4 3
Antimicrobial Class	Antimicrobial (Resistance Breakpoint)		Isolate Source												3
Macrolides	Azithromycin (MIC ≥32 μg/ml)		Humans										0.0%	0.0% 0	1.6% 2
	(	S	Retail Chickens											0.0%	0.0%
		Chickens	HACCP										0.0%	0.0%	0.0%
		٥	Cecal												
		တ္	Retail Ground Turkey												0.0%
		Turkeys	HACCP										0.0% 0	0.0% 0	0.0%
		_	Cecal												
			Retail Ground Beef												
		Cattle	HACCP										0.0%	0.0%	0.0%
		ပိ	Cecal (Beef)												0.000
			Cecal (Dairy)												0.0%
			Retail Pork Chops										0.004		0.0%
		Swine	HACCP										0.0%		0.0%
		Q	Cecal (Market Hogs)												0.0%
Ponicilline	Ampicillin		Cecal (Sows)	8.6%	8.3%	5.6%	6.1%	6.7%	5.5%	9.5%	11.1%	21.8%	25.6%	29.1%	0.0% 0 49.6%
Penicillins	Ampicillin (MIC ≥ 32 μg/ml)	<u> </u>	Humans	3	3	2	2	7	4	8	8	17	25.6%	34	63
		sus	Retail Chickens	0.0%	0.0%	0.0%	0.0%	11.1% 1	0.0%	0.0%	0.0%	0.0%	16 70/	33.3%	0.0%
		Chickens	HACCP			6.8% 3	8.8% 9	17.7% 14	20.4% 10	6.9% 2	9.5% 2	5.9% 1	16.7% 1	11.8% 2	4.8% 1
		_	Cecal	0.001				0.001							100.007
		,ys	Retail Ground Turkey	0.0%		0.001	E0.001	0.0%	0.001				0.001	100.001	100.0%
		Turkeys	HACCP			0.0% 0	50.0% 1	0.0%	0.0%				0.0%	100.0% 1	66.7% 4
			Cecal						0.00:						
			Retail Ground Beef			0.007	0.007	0.007	0.0%	0.007	0.001		F0 22/	00 70	00.007
		Cattle	HACCP			0.0% 0	0.0%	0.0%	0.0% 0	0.0% 0	0.0% 0		50.0% 1	66.7% 2	80.0% 4
		Ö	Cecal (Beef)												
			Cecal (Dairy)												100.0%
			Retail Pork Chops												100.0%
		Swine	HACCP				100.0% 1	50.0% 1	0.0% 0	100.0% 1	0.0% 0	0.0% 0	100.0% 2		
		Ś	Cecal (Market Hogs)												75.0% 3
			Cecal (Sows)					,			0	,	,	0	33.3%
Phenicols	Chloramphenicol (MIC ≥ 32 µg/ml)		Humans	2.9%	0.0%	2.8%	0.0%	1.9%	1.4%	6.0%	8.3%	1.3%	1.2% 1	0.0%	2.4%
		su	Retail Chickens	0.0% 0	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
		Chickens	HACCP			0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%
		0	Cecal	<u> </u>											
		λs	Retail Ground Turkey	0.0% 0				0.0%							0.0%
		Turkeys	HACCP			0.0% 0	0.0% 0	0.0% 0	0.0% 0				0.0% 0	0.0% 0	0.0%
		Ľ	Cecal												
			Retail Ground Beef						0.0% 0						
		Cattle	HACCP			0.0% 0	0.0% 0	0.0%	0.0%	0.0% 0	0.0% 0		0.0% 0	33.3% 1	0.0% 0
		Ca	Cecal (Beef)												
		L	Cecal (Dairy)												0.0% 0
			Retail Pork Chops												0.0%
		Swine	HACCP				0.0% 0	50.0% 1	0.0% 0	100.0% 1	0.0% 0	0.0% 0	0.0% 0		
		Sw	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%

<sup>&</sup>lt;sup>1</sup> N/A = data not available. Antioenic formulas for monophasic *Salmonella* were not determined for food animal isolates prior to 2004
<sup>2</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

Table 52e. Antimicrobial Resistance among Salmonella I 4,[5],12:i:- Isolates, 2002-2013

Year	biai resistance ani	ong .	Salmonella I 4,[5],12	2:1:- ISOIA 2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ed	T	Humans	35	36	36	33	105	73	84	72	78	82	117	127
		ens	Retail Chickens	5	2	4	9	9	2	4	8	2	0	6	3
		Chicke	HACCP	N/A <sup>1</sup>	N/A	44	102	79	49	29	21	17	6	17	21
		ş	Cecal			_				_		_	_		0
		urkey	Retail Ground Turkey HACCP	2 N/A	0 N/A	0 4	0 2	2	0 6	0	0	0	0 2	0 1	6 6
		Ĕ	Cecal												0
		<u>0</u>	Retail Ground Beef	0	0	0	0	0	2	0	0	0	0	0	0
		Catt	HACCP Cecal (Beef)	N/A	N/A	4	2	3	6	1	1	0	2	3	5 0
			Cecal (Dairy)												1
		0	Retail Pork Chops	0	0	0	0	0	0	0	0	0	0	0	2
		Swine	HACCP <sup>2</sup> Cecal (Market Hogs)	N/A	N/A	0	1	2	1	1	1	1	2		4
			Cecal (Sows)												3
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class Quinolones	Breakpoint) Ciprofloxacin	+	Source	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	0.0%	0.0%	0.8%
Quilolones	(MIC ≥ 1 µg/ml)	_	Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1 0.0%	0	0.0%	1 0.0%
		sus	Retail Chickens	0.0%	0.0%	0	0	0	0	0	0	0		0	0
		Chickens	HACCP			0.0% 0	0.0% 0	0.0%	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
		O	Cecal												
			Retail Ground Turkey	0.0%				0.0%							0.0%
		Turkeys	HACCP	U		0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%
		Ţ	Cecal			0	0	0	0				0	0	0
		-							0.0%						
			Retail Ground Beef			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
		Cattle	HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
		ŭ	Cecal (Beef)												
			Cecal (Dairy)												0.0%
			Retail Pork Chops												0.0%
		Φ	HACCP				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0
		Swine	Cecal (Market Hogs)				0	0	0	0	0	0	0		0.0%
															0.0%
	Nalidixic Acid	+	Cecal (Sows)	0.0%	2.8%	2.8%	0.0%	1.0%	1.4%	1.2%	0.0%	2.6%	0.0%	0.0%	0
	(MIC ≥ 32 μg/ml)		Humans	0	1	1	0	1	1	1	0	2	0.078	0	1
		Su	Retail Chickens	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0% 0	0.0%
		Chickens	HACCP			2.3% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%
		ō	Cecal												
			Retail Ground Turkey	0.0%				0.0%							0.0%
		Turkeys	HACCP	0		0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	16.7%
		Ţ	Cecal			0	0	0	0				0	0	1
									0.0%						
			Retail Ground Beef			0.00/	0.00/	0.00/	0	0.00/	0.00/		0.00/	0.00/	0.00/
		Cattle	HACCP			0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0		0.0%	0.0%	0.0%
		Ö	Cecal (Beef)												
			Cecal (Dairy)												0.0%
			Retail Pork Chops												0.0%
		0	HACCP				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		J
		Swine	Cecal (Market Hogs)				0	0	0	0	0	0	0		0.0%
															0.0%
Tetracyclines	Tetracycline	1	Cecal (Sows)	5.7%	0.0%	11.1%	3.0%	8.6%	9.6%	16.7%	16.7%	28.2%	25.6%	33.3%	0 55.1%
. on acyclinics	(MIC ≥ 16 μg/ml)	<u> </u>	Humans	2	0	4	1	9	7	14	12	22	21	39	70
		SU	Retail Chickens	0.0% 0	0.0% 0	0.0% 0	11.1% 1	11.1% 1	0.0% 0	0.0%	25.0% 2	0.0% 0		50.0% 3	0.0%
		Chickens	HACCP			11.4% 5	4.9% 5	3.8%	14.3% 7	3.4% 1	9.5% 2	11.8% 2	33.3% 2	0.0% 0	19.0% 4
		ō	Cecal												
			Retail Ground Turkey	0.0%				0.0%							100.0%
		Turkeys	HACCP	0		0.0%	50.0%	0.0%	0.0%				100.0%	100.0%	100.0%
		Ţ	Cecal			0	1	0	0				1	1	6
		-							0.0%						
			Retail Ground Beef			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	100.0%
		Cattle	HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	100.0%
		రొ	Cecal (Beef)												
			Cecal (Dairy)												0.0%
		$\vdash$	Retail Pork Chops												100.0%
		m	HACCP				100.0%	50.0%	0.0%	100.0%	0.0%	100.0%	100.0%		2
		Swine					1	1	0	1	0	1	2		75.0%
		"	Cecal (Market Hogs)												3 100.0%
	1	1	Cecal (Sows)												3

<sup>&</sup>lt;sup>1</sup> N/A = data not available. Antigenic formulas for monophasic Salmonella were not determined for food animal isolates prior to 2004 <sup>2</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 53a, Resistance Patterns among Salmonella | 4,15],12;i;- Isolates, 2002-2013<sup>1</sup>

Table 53a. Resistance Patte	ems	among Salmonei	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	35	36	36	33	105	73	84	72	78	82	117	127
	Chickens	Retail Chickens HACCP Cecal	5 N/A <sup>2</sup>	2 N/A	4 44	9 102	9 79	2 49	4 29	8 21	2 17	0 6	6 17	3 21 0
	Turkeys	Retail Ground Turkeys HACCP Cecal	2 N/A	0 N/A	0 1	0 2	2 1	0	0	0	0	0 1	0 1	6 6 0
	Cattle	Retail Ground Beef HACCP Cecal (Beef)	0 N/A	0 N/A	0 4	0 2	0 3	2 6	0	0 1	0	0 2	0 3	0 5 0
	Swine	Cecal (Dairy)  Retail Pork Chops  HACCP <sup>3</sup>	0 N/A	0 N/A	0	0 1	0 2	0	0 1	0 1	0 1	0 2	0	2
		Cecal (Market Hogs) Cecal (Sows)												4 3
Resistance Pattern		Source Humans	91.4%	77.8%	80.6%	87.9%	85.7%	82.2%	76.2%	76.4%	66.7%	65.9%	62.4%	39.4%
1. No Resistance Detected	<u> </u>	1	32 100.0%	28 100.0%	29 100.0%	29 88.9%	90 55.6%	60 50.0%	64 100.0%	55 75.0%	52 100.0%	54	73 50.0%	50 100.0%
	sens	Retail Chickens	5	2	4 77.3%	8 76.5%	5 68.4%	1 65.3%	4 82.8%	6 76.2%	2 70.6%	50.0%	3 70.6%	3 76.2%
	Chickens	HACCP			34	78	54	32	24	16	12	3	12	16
		Cecal	400.00/				50.0%							0.0%
	ys	Retail Ground Turkeys	100.0% 2		0.00/	50.00/	1	0.00/				0.00/	0.00/	0
	Turkeys	HACCP			0.0%	50.0% 1	0.0%	0.0%				0.0%	0.0%	0.0%
	<u> </u>	Cecal												
		Retail Ground Beef						50.0% 1						
	Cattle	HACCP			75.0% 3	100.0% 2	100.0% 3	100.0% 6	100.0% 1	100.0% 1		50.0% 1	0.0% 0	0.0% 0
	ő	Cecal (Beef)												
		Cecal (Dairy)												0.0%
		Retail Pork Chops												0.0% 0
	96	HACCP				0.0%	50.0%	100.0%	0.0%	100.0%	0.0%	0.0%		
	Swine	Cecal (Market Hogs)				0			0			U		25.0%
		Cecal (Sows)												0.0%
		Humans	5.7%	5.6%	8.3%	3.0%	9.5%	5.5%	10.7%	12.5%	21.8%	26.8%	28.2%	0 51.2%
2. Resistant to ≥ 3 Antimicrobial Classes	┢	Retail Chickens	0.0%	0.0%	0.0%	11.1%	10 22.2%	0.0%	9 0.0%	9 12.5%	17 0.0%	22	33 33.3%	65 0.0%
	Chickens	HACCP	0	0	0 13.6%	9.8%	19.0%	0 20.4%	0 6.9%	9.5%	0 11.8%	33.3%	2 11.8%	9.5%
	Chic	Cecal			6	10	15	10	2	2	2	2	2	2
	<u> </u>		0.0%				0.0%							100.0%
	eys	Retail Ground Turkey	0		0.0%	50.0%	0.0%	0.0%				0.0%	100.0%	6 100.0%
	Turkeys	HACCP			0	1	0	0				0	1	6
	<u> </u>	Cecal						0.0%						
		Retail Ground Beef			0.00/	0.00/	0.004	0	0.00/	0.00/		50.00/	00.00/	400.00/
	Cattle	HACCP			0.0%	0.0%	0.0%	0.0% 0	0.0%	0.0%		50.0% 1	66.6% 2	100.0% 5
		Cecal (Beef)												
	_	Cecal (Dairy)												100.0% 1
		Retail Pork Chops												100.0% 2
	Swine	HACCP				100.0% 1	50.0% 1	0.0% 0	100.0% 1	0.0% 0	100.0% 1	100.0% 2		
	Š	Cecal (Market Hogs)												75.0% 3
		Cecal (Sows)												66.7% 2
3. Resistant to ≥ 4		Humans	2.9%	0.0%	2.8%	0.0%	3.8%	2.7%	7.1% 6	9.7% 7	19.2% 15	19.5% 16	26.5% 31	48.8% 62
Antimicrobial Classes		Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		33.3% 2	0.0%
	Chickens	HACCP			2.3%	0.0%	1.3%	0.0%	0.0%	4.8%	5.9%	0.0%	0.0%	4.8%
	ర్	Cecal			1	0			0		1	0	0	
	┢	Retail Ground Turkey	0.0%				0.0%							100.0%
	Turkeys	HACCP	U		0.0%	50.0%	0.0%	0.0%				0.0%	100.0%	66.7%
	2	Cecal			0	1	0	0				0	1	4
	H	Retail Ground Beef						0.0%						
	e e	HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	66.6%	80.0%
	Cattle	Cecal (Beef)			0	0	0	0	0	0		0	2	4
		Cecal (Dairy)												0.0%
	H	Retail Pork Chops												100.0%
		HACCP				100.0%	50.0%	0.0%	100.0%	0.0%	100.0%	100.0%		2
	Swine	Cecal (Market Hogs)				1	1	0	1	0	1	2		75.0%
		Cecal (Narket Hogs)												3 33.3%
<sup>1</sup> Starting in 2011, testing included n	1		a the addition	of the moor	olido ozithrom	vein Beegu					()tii			1

Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

N/A = data not available. Antigenic formulas for monophasic Salmonella were not determined for food animal isolates prior to 2004

<sup>&</sup>lt;sup>3</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 53b, Resistance Patterns among Salmonella I 4,[5],12:i:- Isolates, 2002-2013<sup>1</sup>

Table 53b. Resistance Patt	erns	among Salmonel	lla I 4,[5],1 2002	12:i:- Isola 2003	tes, 2002-	2013'	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	35	36	36	33	105	73	84	72	78	82	117	127
	Chickens	Retail Chickens HACCP Cecal	5 N/A <sup>2</sup>	2 N/A	4 44	9 102	9 79	2 49	4 29	8 21	2 17	0 6	6 7	3 21 0
	Turkeys	Retail Ground Turkey HACCP Cecal	2 N/A	0 N/A	0	0 2	2	0	0	0	0	0	0	6 6 0
	Cattle	Retail Ground Beef HACCP Cecal (Beef)	0 N/A	0 N/A	0 4	0 2	0 3	2 6	0	0 1	0	0 2	0 3	0 5 0
	Swine	Cecal (Dairy)  Retail Pork Chops  HACCP <sup>3</sup>	0 N/A	0 N/A	0	0	0 2	0	0	0 1	0	0 2	0	2
	S	Cecal (Market Hogs) Cecal (Sows)												4 3
Resistance Pattern	<u> </u>	Source Humans	2.9%	0.0%	2.8%	0.0%	2.9%	1.4%	4.8%	6.9%	3.8%	0.0%	0.9%	2.4%
4. Resistant to ≥ 5 Antimicrobial Classes	-	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5 0.0%	0.0%	0	33.3%	0.0%
	Chickens	HACCP	0	0	0 2.3%	0.0%	1.3%	0.0%	0.0%	0 4.8%	0.0%	0.0%	0.0%	0 4.8%
	Chic	Cecal			1	0	1	0	0	1	0	0	0	1
	<u> </u>		0.0%				0.0%							0.0%
	ske	Retail Ground Turkey	0		0.0%	50.0%	0.0%	0.0%				0.0%	0.0%	0.0%
	Turkeys	HACCP			0.076	1	0.070	0.070				0.070	0.076	0.076
	<u> </u>	Cecal						0.00/						
		Retail Ground Beef			0.05	0.00:	0.05:	0.0%	0.00:	0.05:		0.05:	20.07	0.05:
	Cattle	HACCP			0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	33.3% 1	0.0% 0
	S	Cecal (Beef)												
		Cecal (Dairy)												0.0% 0
		Retail Pork Chops												0.0% 0
	Swine	HACCP				0.0%	0.0%	0.0%	100.0% 1	0.0%	0.0%	0.0%		
	Š	Cecal (Market Hogs)												0.0% 0
		Cecal (Sows)												0.0% 0
5. At Least ACSSuT <sup>4</sup> Resistant		Humans	2.9%	0.0%	2.8%	0.0%	1.9%	1.4%	3.6%	6.9% 5	1.3%	0.0%	0.0%	0.8%
3. At Least Account Resistant		Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
	Chickens	HACCP	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	ర్	Cecal			0	0	0	0	0	0	0	0	0	0
	_	Retail Ground Turkey	0.0%				0.0%							0.0%
	Turkeys	HACCP	0		0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%
	₽	Cecal			0	0	0	0				0	0	0
	_	Retail Ground Beef						0.0%						
	9	HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	33.3%	0.0%
	Cattle	Cecal (Beef)				0	U	U	U	U		0		U
		Cecal (Dairy)												0.0%
	H	Retail Pork Chops												0.0%
	96	HACCP				0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%		
	Swine	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0.0%
6. At Least ACT/S <sup>5</sup> Resistant		Humans	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%
	s	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
	Chickens	HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	ō	Cecal												
	s	Retail Ground Turkey	0.0% 0				0.0% 0							0.0% 0
	Turkeys	HACCP			0.0% 0	0.0% 0	0.0% 0	0.0% 0				0.0% 0	0.0% 0	0.0% 0
	Ľ	Cecal												
		Retail Ground Beef						0.0% 0						
	Cattle	HACCP			0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0%		0.0% 0	0.0% 0	0.0% 0
	స	Cecal (Beef)												
	L	Cecal (Dairy)												0.0% 0
		Retail Pork Chops												0.0% 0
	Swine	HACCP				0.0% 0	0.0% 0	0.0% 0	0.0%	0.0%	0.0% 0	0.0% 0		
	ð	Cecal (Market Hogs)												0.0% 0
		Cecal (Sows)												0.0% 0
1 Starting in 2011, testing included r	ino a	ntimicrohial classes with	h the addition	of the macr	olide azithron	wein Rocaus	o registence	to azithromy	cin is low (in t	hic caco -19	2/ ) antimiero	hial alaga		

Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

N/A = data not available. Antigenic formulas for monophasic Salmonella were not determined for food animal isolates prior to 2004

<sup>&</sup>lt;sup>3</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low <sup>4</sup> ACSSUT = ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline <sup>5</sup> ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole

Table 53c. Resistance Patterns among Salmonella | 4.151.12:i:- Isolates, 2002-2013

Table 53c. Resistance Patte	,,,,,	among Samoner												
Year		Ulumana	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested	S	Humans Patril Chialana	35	36	36	33	105	73	84	72	78	82	117	127
	ckens	Retail Chickens HACCP	5 N/A <sup>1</sup>	2 N/A	4 44	9 102	9 79	2 49	4 29	8 21	2 17	0 6	6 7	3 21
	Chick	Cecal												0
	ske	Retail Ground Turkey	2	0	0	0	2	0	0	0	0	0	0	6
	Turkeys	HACCP	N/A	N/A	1	2	1	1	0	0	0	1	1	6
		Cecal												0
	tle	Retail Ground Beef HACCP	0 N/A	0 N/A	0 4	0 2	0	2 6	0	0	0	0 2	0	0 5
	Cattle	Cecal (Beef)												0
		Cecal (Dairy)												1
	0	Retail Pork Chops HACCP <sup>2</sup>	0	0	0	0	0	0	0	0	0	0	0	2
	Swine	Cecal (Market Hogs)	N/A	N/A	0	1	2	1	1	1	1	2		4
		Cecal (Sows)												3
Resistance Pattern		Source	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%	0.0%	0.0%	0.0%	0.0%	0.0%
7. At Least ACSSuTAuCx <sup>3</sup>		Humans	0	0	0	0	0	0	2	0	0	0	0	0
Resistant	s	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
	Chickens	HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	ర్	Cecal			U	U	U	0	U	U	0	0	U	U
			0.0%				0.0%							0.0%
	S.	Retail Ground Turkey	0				0							0
	Turkeys	HACCP			0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%
	-	Cecal												
		Retail Ground Beef						0.0%						
					0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
	Cattle	HACCP			0	0	0	0	0	0		0	0	0
	O	Cecal (Beef)												
		Cecal (Dairy)												0.0%
		Retail Pork Chops												0.0%
		HACCP				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0
	Swine					0	0	0	0	0	0	0		0.0%
	S	Cecal (Market Hogs)												0
		Cecal (Sows)												0.0%
		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
8. At Least Ceftriaxone and Nalidixic Acid Resistant	-	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0.0%	0.0%
	Sue		0	0	0 2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP			2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	U	Cecal												
		Retail Ground Turkey	0.0%				0.0%							0.0%
	Turkeys	HACCP	0		0.0%	0.0%	0.0%	0.0%				0.0%	0.0%	0.0%
	Ę				0	0	0	0				0	0	0
		Cecal												
		Retail Ground Beef						0.0%						
	9	HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
	Cattle	Cecal (Beef)			0	0	0	0	0	0		0	0	0
														0.0%
		Cecal (Dairy)												0
		Retail Pork Chops												0.0%
	Φ	HACCP				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
	Swine	Cecal (Market Hogs)				0	0	0	0	0	0	0		0.0%
														0.0%
1 N/A = data not available. Antigenic	<u> </u>	Cecal (Sows)												0.070

<sup>&</sup>lt;sup>1</sup> N/A = data not available. Antigenic formulas for monophasic Salmonella were not determined for food animal isolates prior to 2004 <sup>2</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low <sup>3</sup> ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

Table 54a. Antimicrobial Resistance among Salmonella Infantis Isolates, 2002-2013

	obial Resistance am	ong .	Salmonella Infantis				2005	2000	2007	2000	2000	2010	2011	2012	2012
Year Number of Isolates Tes	sted		Humans	<b>2002</b> 37	<b>2003</b> 31	<b>2004</b> 29	<b>2005</b> 30	<b>2006</b> 22	<b>2007</b> 26	<b>2008</b> 51	<b>2009</b> 44	<b>2010</b> 53	<b>2011</b> 63	<b>2012</b> 90	<b>2013</b> 76
rediffice of isolates re-	3104	sue	Retail	1	0	0	0	1	1	5	3	3	4	3	8
		Chickens	HACCP	20	27	19	17	16	16	14	3	4	16	31	35
		_	Cecal Retail	0	0	0	0	0	0	1	1	2	1	3	1 2
		Turkeys	HACCP	1	0	0	0	0	1	0	1	0	0	0	0
		F	Cecal												0
		te	Retail HACCP	0 26	1 12	0 18	0 7	0 13	0 13	0 4	0	0 5	3 15	1 4	2 7
		Cattle	Cecal (Beef)	20	12	10	,	10	10	-	·	J	15	_	3
			Cecal (Dairy)						_						
		Swine	Retail HACCP <sup>1</sup>	0 20	0 15	0 22	1 27	2 16	5 17	1 15	2 10	1 9	1 10	1	1
		Š	Cecal (Market Hogs) Cecal (Sows)												20
	Antimicrobial														27
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
Aminoglycosides	Gentamicin (MIC ≥ 16 µg/mI)		Humans	0.0%	0.0% 0	0.0%	0.0%	4.5% 1	0.0%	0.0%	0.0%	0.0% 0	1.6% 1	0.0%	3.9%
		S	Retail	0.0%				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.5% 1
		Chickens	HACCP	5.0% 1	0.0% 0	5.3% 1	0.0%	6.3% 1	0.0%	0.0%	0.0%	25.0% 1	0.0%	16.1% 5	0.0%
		ò	Cecal				-								0.0%
			Retail							0.0%	100.0%	100.0%	100.0%	100.0% 3	100.0%
		Turkeys	HACCP	0.0%					0.0%	U	0.0%		1	3	
		Ţ	Cecal	0					0		0				
		-	Retail		0.0%								0.0%	0.0%	0.0%
			HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle		0	0	0	0	0	0	0	0	0	0	0	0.0%
		Ĭ	Cecal (Beef)												0.0%
			Cecal (Dairy)				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			Retail	0.00/	0.00/	4.50/	0	0	0	0	0	0	0	0.0%	0.0%
		Swine	HACCP	0.0% 0	0.0% 0	4.5% 1	3.7% 1	6.3% 1	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0		
		Š	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0% 0
	Kanamycin (MIC ≥ 64 µg/mI)		Humans	0.0%	3.2% 1	0.0%	0.0%	0.0%	0.0%	0.0%	6.8%	0.0%	0.0%	2.2%	3.9%
		S	Retail	0.0%				0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0% 0
		Chickens	HACCP	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		င်	Cecal		Ü						Ů				0.0%
			Retail							0.0%	100.0%	100.0%	0.0%	100.0%	50.0%
		Turkeys	HACCP	0.0%					0.0%	0	100.0%	2	0	3	1
		Ţ	Cecal	0					0		1				
			Retail		0.0%								0.0%	0.0%	0.0%
			HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle		0	0	0	0	0	0	0	0	0	0	0	0.0%
		0	Cecal (Beef)												0.0%
			Cecal (Dairy)				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			Retail	0.007	0.0%	0.0%	0	0	0	0	0	0	0	0.0%	0.0%
		Swine	HACCP	0.0%	0.0%	0.0%	0.0%	6.3% 1	5.9% 1	0.0%	0.0%	33.3% 3	20.0%		
		Ø	Cecal (Market Hogs)												0.0%
		$\perp$	Cecal (Sows)												7.4% 2
	Streptomycin (MIC ≥ 64 µg/ml)		Humans	2.7% 1	9.7% 3	0.0%	3.3% 1	4.5% 1	3.8% 1	2.0% 1	6.8% 3	1.9% 1	4.8% 3	0.0% 0	3.9% 3
	,	ω	Retail	0.0%				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%	9.7%	2.9%
		S	Cecal			0		0		0				3	0.0%
		<b>—</b>	Retail							0.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Turkeys	HACCP	100.0%					100.0%	0	100.0%	2	1	3	2
		Ţ	Cecal	1					1		1				
		-	Retail		0.0%								0.0%	0.0%	0.0%
				0.0%	0 8.3%	0.0%	14.3%	15.4%	0.0%	0.0%	0.0%	0.0%	6.7%	25.0%	0.0%
		Cattle	HACCP	0.070	1	0.070	1	2	0.076	0.070	0.070	0.070	1	1	0.0%
		O	Cecal (Beef)												0
			Cecal (Dairy)												0.0%
			Retail				0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0%	0.0%
		ine	HACCP	0.0% 0	0.0% 0	4.5% 1	11.1% 3	12.5% 2	0.0% 0	0.0% 0	0.0%	11.1% 1	30.0%		
		Swine	Cecal (Market Hogs)												15.0% 3
			Cecal (Sows)												11.1%
- 0040 d 0040 FOIC	2 did not comple producte t	for Sa	Imonella because in prior	r veare the n	orcont of po	rk careace e	omplee pesi	tive for Cole	annella was	oonoiotontly	low				

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 54b. Antimicrobial Resistance among Salmonella Infantis Isolates, 2002-2013

Year	bial Resistance amo	ong	Salmonella Infantis	Isolates,	2002-201	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ed		Humans	37	31	29	30	22	26	51	44	53	63	90	76
		ens	Retail	1	0	0	0	1	1	5	3	3	4	3	8
		Chickens	HACCP	20	27	19	17	16	16	14	3	4	16	31	35
			Cecal						•		,				1
		Turkeys	Retail HACCP	0	0	0	0	0	0	0	1	0	0	3	2 0
		1	Cecal												0
		Ф	Retail	0	1	0	0	0	0	0	0	0	3	1	2
		Cattle	HACCP Cecal (Beef)	26	12	18	7	13	13	4	1	5	15	4	7 3
			Cecal (Dairy)												0
		Ф	Retail	0	0	0	1	2	5	1	2	1	1	1	1
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	20	15	22	27	16	17	15	10	9	10	0	0 20
			Cecal (Sows)												27
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class β-Lactam/β-Lactamase	Breakpoint) Amoxicillin-		Source	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	9.1%	3.8%	1.6%	1.1%	3.9%
Inhibitor Combinations	Clavulanic Acid		Humans	1 0.0%	0	0	0	0.0%	0.0%	0.0%	4 0.0%	2 0.0%	1 25.0%	1 0.0%	3
	(MIC ≥ 32 / 16 μg/ml)	SU	Retail	0				0	0	0	0	0	1	0	0
		Chickens	HACCP	0.0%	0.0%	0.0%	5.9% 1	6.3% 1	0.0%	0.0%	0.0%	25.0% 1	6.3% 1	0.0%	5.7% 2
		0	Cecal												0.0%
			Retail							0.0%	100.0% 1	100.0% 2	100.0% 1	100.0% 3	50.0% 1
		Turkeys	HACCP	0.0%					100.0%	Ť	100.0%				
		Ţ	Cecal	0					1		1				
		-	Retail		0.0%								0.0%	0.0%	0.0%
				0.0%	0 8.3%	0.0%	14.3%	23.1%	0.0%	0.0%	0.0%	0.0%	0 6.7%	0.0%	0.0%
		Cattle	HACCP	0	1	0	1	3	0	0	0	0	1	0	0.0%
		O	Cecal (Beef)												0
			Cecal (Dairy)												0.0% 0
			Retail				0.0%	0.0%	0.0%	0.0%	50.0% 1	0.0%	0.0%	0.0%	0.0%
		e e	HACCP	0.0%	0.0%	4.5% 1	0.0% 0	6.3% 1	0.0% 0	0.0% 0	0.0%	0.0% 0	10.0% 1		
		Swine	Cecal (Market Hogs)						J	Ü	J	- J			10.0% 2
			Cecal (Sows)												7.4%
Cephems	Cefoxitin		Humans	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.4%	3.8%	1.6%	1.1%	3.9%
	(MIC ≥ 32 μg/ml)		1	0.0%	0	0	0	0.0%	0.0%	0.0%	5 0.0%	0.0%	1 25.0%	1 0.0%	0.0%
		ens	Retail	0.0%	0.0%	0.0%	5.9%	0 12.5%	0.0%	0.0%	0.0%	0 25.0%	1 6.3%	0.0%	0 5.7%
		Chickens	HACCP	0.070	0.070	0.070	1	2	0.076	0.070	0.070	1	1	0.070	2
			Cecal												0.0%
		s	Retail							0.0% 0	100.0% 1	100.0% 2	100.0% 1	100.0% 3	50.0% 1
		Turkeys	HACCP	0.0%					100.0% 1		100.0% 1				
		F	Cecal												
			Retail		0.0%								0.0%	0.0%	0.0%
		0	HACCP	0.0%	8.3%	0.0%	14.3%	23.1%	0.0%	0.0%	0.0%	0.0%	6.7%	0.0%	0.0%
		Cattle		0	1	0	1	3	0	0	0	0	1	0	0.0%
			Cecal (Beef)												0.0%
			Cecal (Dairy)				0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%
			Retail	0.0%	0.004	4 501	0	0	0	0	1 0.0%	0	0	0.0%	0.0%
		Swine	HACCP	0.0%	0.0% 0	4.5% 1	0.0%	6.3% 1	0.0% 0	0.0% 0	0.0%	0.0% 0	10.0% 1		
		ð	Cecal (Market Hogs)												10.0% 2
			Cecal (Sows)												7.4% 2
	Ceftiofur (MIC ≥ 8 μg/mI)		Humans	2.7%	0.0%	0.0%	0.0%	0.0% 0	3.8%	0.0% 0	11.4% 5	3.8%	1.6% 1	2.2%	6.6% 5
	,о = 0 руппі)	_	Retail	0.0%				0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%
		Chickens	HACCP	0.0%	0.0%	0.0%	5.9%	6.3%	0.0%	0.0%	0.0%	25.0%	6.3%	0.0%	5.7%
		Chic	Cecal	0	0	0	1	1	0	0	0	1	1	0	0.0%
		$\vdash$								0.0%	100.0%	100.0%	100.0%	100.0%	0 50.0%
		3ys	Retail	0.0%					100.0%	0	1 100.0%	2	1	3	1
		Turkeys	HACCP	0.076					1		1				
			Cecal											6.51	
			Retail		0.0%								0.0% 0	0.0% 0	0.0%
		‡	HACCP	0.0%	8.3% 1	0.0%	14.3% 1	23.1% 3	0.0%	0.0%	0.0%	0.0%	6.7% 1	0.0%	0.0%
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail				0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%
				0.0%	0.0%	0.0%	0.0%	0 6.3%	0.0%	0.0%	0.0%	0.0%	0 10.0%	0	0
		Swine	HACCP	0	0	0	0	1	0	0	0	0	1		10.0%
		S	Cecal (Market Hogs)												2
			Cecal (Sows)												7.4% 2
1 In 2012 and 2013 FSIS	did not sample products fo	or Sa	monella because in prior	r vears the r	ercent of no	rk carcass s	amples posi	tive for Saln	nonella was i	consistently	low				

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Year			Salmonella Infantis	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ted	SL	Humans Retail	37	31	29 0	30	22	26	51 5	44	53	63 4	90	76 8
		Chickens	HACCP	1 20	0 27	19	0 17	1 16	1 16	5 14	3	3 4	4 16	3 31	8 35
		C C	Cecal Retail	0	0	0	0	0	0	1	1	2	1	3	1 2
		urkey	HACCP	1	0	0	0	0	1	0	1	0	0	0	0
		-	Cecal Retail Ground Beef	0	1	0	0	0	0	0	0	0	3	1	0 2
		Cattle	HACCP	26	12	18	7	13	13	4	1	5	15	4	7
		O	Cecal (Beef) Cecal (Dairy)												3
		ө	Retail Pork Chops	0	0	0	1	2	5	1	2	1	1	1	1
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	20	15	22	27	16	17	15	10	9	10	0	0 20
	Antimicrobial		Cecal (Sows)												27
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
Cephems	Ceftriaxone (MIC ≥ 4 µg/ml)		Humans	2.7% 1	0.0%	0.0%	0.0%	0.0%	3.8% 1	0.0%	11.4% 5	3.8% 2	1.6% 1	2.2%	6.6% 5
	, , ,	S	Retail	0.0% 0				0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	25.0% 1	0.0%
		Chickens	HACCP	0.0%	0.0%	0.0%	5.9% 1	6.3% 1	0.0% 0	0.0% 0	0.0%	25.0% 1	6.3% 1	0.0% 0	5.7% 2
		ò	Cecal												0.0%
			Retail							0.0%	100.0% 1	100.0%	100.0% 1	100.0% 3	50.0% 1
		Turkeys	HACCP	0.0%					100.0% 1		100.0% 1				
		Ĕ	Cecal						·						
			Retail		0.0%								0.0%	0.0%	0.0%
		<u>a</u>	HACCP	0.0%	8.3% 1	0.0%	14.3% 1	23.1% 3	0.0%	0.0%	0.0%	0.0%	6.7% 1	0.0%	0.0%
		Cattle	Cecal (Beef)		,							Ů	,		0.0%
			Cecal (Dairy)												0.0%
			Retail				0.0%	0.0%	0.0%	0.0%	50.0% 1	0.0%	0.0%	0.0%	0.0%
		e e	HACCP	0.0%	0.0%	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	0.0%	10.0%	0	
		Swine	Cecal (Market Hogs)	0		0	0		0	0	0	0			10.0%
			Cecal (Sows)												7.4% 2
Folate Pathway Inhibito	Sulfamethoxazole/ Sulfisoxazole <sup>2</sup>		Humans	5.4%	9.7%	3.4%	6.7%	9.1%	3.8%	3.9%	6.8%	7.5%	4.8%	3.3%	9.2%
	(MIC ≥ 512 µg/ml)		Retail	0.0%	3	1	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.5%
		Chickens	HACCP	0.0%	0.0%	10.5%	0.0%	6.3%	0.0%	0.0%	0.0%	25.0%	0.0%	16.1%	0.0%
		Ş	Cecal	0	0	2	0	1	0	0	0	1	0	5	0.0%
			Retail							0.0%	100.0%	100.0%	100.0%	100.0%	100.09
		Turkeys	HACCP	100.0%					100.0%	0	100.0%	2	1	3	2
		Ţ	Cecal	1					1		1				
		-	Retail		0.0%								0.0%	0.0%	0.0%
		0	HACCP	0.0%	8.3%	0.0%	14.3%	15.4%	0.0%	0.0%	0.0%	0.0%	6.7%	0 25.0%	0.0%
		Cattle	Cecal (Beef)	0	1	0	1	2	0	0	0	0	1	1	0.0%
			Cecal (Dairy)												0.0%
			Retail				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			HACCP	5.0%	6.7%	4.5%	3.7%	0 18.8%	0.0%	0.0%	10.0%	0.0%	10.0%	0	0
		Swine	Cecal (Market Hogs)	1	1	1	1	3	0	0	1	0	1		10.0%
			Cecal (Sows)												7.4%
	Trimethoprim-	H	Humans	0.0%	3.2%	3.4%	0.0%	0.0%	0.0%	2.0%	2.3%	1.9%	1.6%	4.4%	3.9%
	Sulfamethoxazole (MIC ≥ 4 / 76 µg/ml)		Retail	0.0%	1	1	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chic	Cecal	0	0	0	0	0	0	0	0	0	0	0	0.0%
		-	Retail							0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		eys	HACCP	100.0%					0.0%	0	0.0%	0	0	0	0
		Turkeys		1					0		0				
			Cecal		0.0%								0.0%	0.0%	0.0%
			Retail	0.0%	0.0%	0.0%	0.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0 6.7%	0.0%	0.0%
		Cattle	HACCP	0	0	0	0	1	0	0	0	0	1	0	0.0%
			Cecal (Beef)												0.0%
			Cecal (Dairy)				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			Retail	5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.076	0.070
		Swine	Cecal (Market Hogs)	1	0	0	0	0	0	0	0	0	0		0.0%
		0,	Cecal (Market Hogs)  Cecal (Sows)												0 3.7%
	1	1	Octor (OUWS)												1

Table 54d. Antimicro	bolai Resistance amo	ong .	Saimoneila Infantis	2002	2002-201	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ed		Humans	37	31	29	30	22	26	51	44	53	63	90	76
		Chickens	Retail HACCP	1	0	0	0	1	1	5	3	3	4	3	8
		S. S.	Cecal	20	27	19	17	16	16	14	3	4	16	31	35 1
		eys	Retail	0	0	0	0	0	0	1	1	2	1	3	2
		Turkeys	HACCP Cecal	26	12	18	7	13	13	4	1	5	15	4	7
			Retail Ground Beef	0	1	0	0	0	0	0	0	0	3	1	2
		Cattle	HACCP	26	12	18	7	13	13	4	1	5	15	4	7
			Cecal (Beef) Cecal (Dairy)												3
			Retail Pork Chops	0	0	0	1	2	5	1	2	1	1	1	1
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	20	15	22	27	16	17	15	10	9	10	0	0 20
		0,	Cecal (Narket Hogs)												27
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class Macrolides	Breakpoint) Azithromycin		Source										0.0%	0.0%	0.0%
indo: ondo	(MIC ≥32 µg/mI)		Humans										0.0%	0.0%	0.0%
		ens	Retail										0.0%	0.0%	0.0%
		Chickens	HACCP										0	0	0.0%
			Cecal										0.0%	0.0%	0.0%
		3ys	Retail										0.0%	0.0%	0.0%
		Turkeys	HACCP										0.0%	0.0%	0.0%
			Cecal										0.0%	0.0%	0.0%
			Retail										0.0%	0.0%	0.0%
		Cattle	HACCP										0.0%	0.0%	0.0%
		O	Cecal (Beef)												0
			Cecal (Dairy)										0.00/	0.00/	0.0%
			Retail										0.0%	0.0%	0.0%
		Swine	HACCP										0.0%		
		Š	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												3.7% 1
Penicillins	Ampicillin (MIC ≥ 32 µg/mI)		Humans	2.7% 1	0.0%	0.0%	0.0%	0.0%	3.8% 1	2.0%	13.6% 6	5.7% 3	1.6% 1	2.2%	9.2% 7
		S	Retail	0.0%				0.0%	0.0%	0.0%	0.0%	0.0%	25.0% 1	0.0%	0.0%
		Chickens	HACCP	0.0%	0.0% 0	0.0% 0	5.9% 1	18.8% 3	0.0%	0.0%	0.0%	25.0% 1	6.3% 1	0.0%	5.7% 2
			Cecal	Ü	Ů	- U		- ŭ	- ŭ	J	J				0.0%
			Retail							0.0%	100.0%	100.0%	100.0% 1	100.0%	50.0%
		Turkeys	HACCP	0.0%					100.0%	0	100.0%			3	
		ī	Cecal	0					1		1				
			Retail		0.0%								0.0%	0.0%	0.0%
			HACCP	0.0%	0 8.3%	14.3%	23.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0 6.7%	0.0%	0.0%
		Cattle		0	1	1	3	0	0	0	0	0	1	0	0.0%
		ľ	Cecal (Beef)												0.0%
		-	Cecal (Dairy)				0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%
			Retail	10.0%	0.0%	4.5%	0.0%	0 6.3%	0.0%	0.0%	1 10.0%	33.3%	0 30.0%	0.070	0.070
		Swine	HACCP	2	0.076	1	0.078	1	0.076	0.076	1	3	3		10.0%
		S	Cecal (Market Hogs)												7.4%
Dhaniar's	Chlorometer	1	Cecal (Sows)	0.70/	0.001	0.001	0.007	0.001	0.001	0.001	A 501	0.007	4.007	4.401	2
Phenicols	Chloramphenicol (MIC ≥ 32 µg/ml)		Humans	2.7%	0.0%	0.0%	0.0% 0	0.0%	0.0%	2.0%	4.5%	3.8%	1.6%	1.1%	3.9%
		us	Retail	0.0% 0				0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0	0.0%
		Chickens	HACCP	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%
		O	Cecal												0.0%
		s	Retail							0.0% 0	100.0% 1	100.0% 2	100.0% 1	100.0% 3	50.0% 1
		Turkeys	HACCP	0.0%					0.0%		0.0%				
		ĭ	Cecal												
			Retail		0.0%								0.0%	0.0%	0.0%
		0	HACCP	0.0%	8.3%	0.0%	14.3%	15.4%	0.0%	0.0%	0.0%	0.0%	6.7%	0.0%	0.0%
		Cattle	Cecal (Beef)	0	1	0	1	2	0	0	0	0	1	0	0.0%
			Cecal (Dairy)												0.0%
		-	Retail				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
				0.0%	0.0%	0.0%	0.0%	0 12.5%	0.0%	0.0%	0.0%	0.0%	0 10.0%	0	0
		Swine	HACCP	0	0	0	0	2	0	0	0	0	1		5.0%
		0)	Cecal (Market Hogs)												7.4%
1 - 2040 2042 FOIC			Cecal (Sows)												2

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 54e. Antimicrobial Resistance among Salmonella Infantis Isolates, 2002-2013

Year	obial Resistance amo	Jilg .	Samionena ilitaritis	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	ted	S	Humans	37	31	29	30	22	26	51	44	53	63	90	76
		Chickens	Retail HACCP	1 20	0 27	0 19	0 17	1 16	1 16	5 14	3	3 4	4 16	3 31	8 35
		ర్	Cecal												1
		Turkeys	Retail HACCP	0	0	0	0	0	0	1 0	1	2	1 0	3	2
		2	Cecal												0
		e	Retail Ground Beef HACCP	0 26	1 12	0 18	0 7	0 13	0 13	0 4	0	0 5	3 15	1 4	2 7
		Cattle	Cecal (Beef)	20	12	10	,	10	10	_	·		10	7	3
		-	Cecal (Dairy)		0	0		2	_		2				0
		Swine	Retail Pork Chops HACCP <sup>1</sup>	0 20	0 15	0 22	1 27	2 16	5 17	1 15	2 10	1 9	1 10	0	0
		õ	Cecal (Market Hogs) Cecal (Sows)												20 27
	Antimicrobial (Resistance		Isolate												21
Antimicrobial Class	Breakpoint)		Source	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/
Quinolones	Ciprofloxacin (MIC ≥ 1 µg/ml)		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		sus	Retail	0.0%	0.00/	2.22/	0.00/	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%
			Cecal												0.0%
		s,	Retail							0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0%
		Turkeys	HACCP	0.0%					0.0%		0.0%				
		Ĺ	Cecal												
			Retail		0.0% 0								0.0% 0	0.0%	0.0%
		Cattle	HACCP	0.0% 0	0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
		రొ	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail				0.0%	0.0%	0.0%	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0%	0.0%
		Swine	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0		
		Sw	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0% 0
	Nalidixic Acid (MIC ≥ 32 μg/mI)		Humans	0.0%	6.5% 2	3.4% 1	3.3% 1	0.0%	0.0%	2.0%	2.3%	0.0%	1.6% 1	4.4% 4	5.3% 4
	,	s	Retail	0.0%				0.0%	0.0%	0.0%	0.0% 0	0.0%	0.0% 0	0.0%	0.0%
		Chickens	HACCP	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		ర్	Cecal		Ů						Ü				0.0%
			Retail							0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys	HACCP	0.0%					0.0%		0.0%				
		ı	Cecal												
			Retail		0.0%								0.0%	0.0%	0.0%
		<u>a</u>	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)			Ü		Ü	J		Ü		Ů		0.0%
			Cecal (Dairy)												0.0%
			Retail				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		e e	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0
		Swine	Cecal (Market Hogs)	0		0	0	0	0	0	Ü	0			0.0%
			Cecal (Sows)												0.0%
Tetracyclines	Tetracycline (MIC ≥ 16 µg/ml)		Humans	2.7%	6.5%	0.0%	3.3%	4.5% 1	7.7%	3.9%	11.4%	3.8%	4.8%	4.4% 4	13.2%
	(MIC 2 16 µg/mi)		Retail	0.0%	2	0	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	0.0%	0.0%	5.3%	0.0%	12.5%	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	5.7%
		S	Cecal	0	0	1	0	2	0	0	0	1	0	0	0.0%
			Retail							0.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		Turkeys	HACCP	100.0%					100.0%	0	100.0%	2	1	3	2
		Tur	Cecal	1					1		1				
		$\vdash$	Retail		0.0%								0.0%	0.0%	0.0%
		_	HACCP	0.0%	0 8.3%	0.0%	28.6%	15.4%	0.0%	0.0%	0.0%	20.0%	0 6.7%	0 25.0%	0.0%
		Cattle	Cecal (Beef)	0	1	0	2	2	0	0	0	1	1	1	0.0%
		آ													0.0%
		-	Cecal (Dairy)				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			Retail	10.0%	6.7%	4.5%	0 3.7%	0 12.5%	0 11.8%	0.0%	0	33.3%	0 30.0%	0	0
		Swine	HACCP	2	1	1	1	2	2	0.070	1	3	3		15.0%
		0,	Cecal (Market Hogs)												3
			Cecal (Sows)												3

In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 55a. Resistance Pat Year	enilo è		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	37	31	29	30	22	26	51	44	53	63	90	76
	Chickens	Retail Chickens HACCP Cecal	1 20	0 27	0 19	0 17	1 16	1 16	5 14	3	3 4	4 16	3 31	8 35 1
	Turkeys	Retail Ground Turkeys HACCP Cecal	0	0	0	0	0	0 1	1 0	1	2	1 0	3 0	2 0 0
	Cattle	Retail Ground Beef HACCP Cecal (Beef) Cecal (Dairy)	0 26	1 12	0 18	0 7	0 13	0 13	0 4	0	0 5	3 15	1 4	2 7 1 3
	Swine	Retail Pork Chops HACCP <sup>2</sup> Cecal (Market Hogs) Cecal (Sows)	0 20	0 15	0 22	1 27	2 16	5 17	1 15	2 10	1 9	1 10	1	1 20 27
Resistance Pattern		Source												
1. No Resistance Detected		Humans	94.6% 35	83.9% 26	93.1% 27	90.0% 27	90.9% 20	92.3% 24	96.1% 49	84.1% 37	88.7% 47	93.7% 59	92.2% 83	81.6% 62
	so.	Retail Chickens	100.0% 1				100.0% 1	100.0%	100.0% 5	100.0% 3	100.0% 3	75.0% 3	100.0%	87.5% 7
	Chickens	HACCP	90.0% 18	100.0% 27	89.5% 17	94.1% 16	81.3% 13	100.0% 16	100.0% 14	100.0% 3	75.0% 3	93.8% 15	83.9% 26	88.6% 31
	Ö	Cecal	10	21	.,	10	13	10	14	3	3	13	20	100.0%
		Retail Ground Turkeys							100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Turkeys	HACCP	0.0%					0.0%	1	0.0%	0	0	0	0
	Ę		0					0		0				
	_	Cecal		100.0%								100.0%	100.0%	100.0%
		Retail Ground Beef	100.00/	1	400.00/	74.40/	70.00/	400.000/	100.00/	100.00/	22.22/	3	1	2
	Cattle	HACCP	100.0% 26	91.7% 11	100.0% 18	71.4% 5	76.9% 10	100.00% 13	100.0% 4	100.0% 1	80.0% 4	93.3% 14	75.0% 3	100.0% 7
	Ö	Cecal (Beef)												100.0% 1
		Cecal (Dairy)												100.0%
		Retail Pork Chops				100.0% 1	100.0% 2	10.0% 5	100.0% 1	50.0% 1	100.0% 1	100.0% 1	100.0%	100.0% 1
	Φ.	HACCP	80.0%	93.3%	90.9%	88.9%	81.3%	88.2%	100.0%	90.0%	66.7%	70.0%		
	Swine	Cecal (Market Hogs)	16	14	20	24	13	15	15	9	6	7		80.0%
		Cecal (Sows)												16 88.9%
			2.7%	3.2%	0.0%	3.3%	4.5%	7.7%	3.9%	15.9%	3.8%	6.3%	4.4%	24 10.5%
2. Resistant to ≥ 3 Antimicrobial Classes	_	Humans	1 0.0%	1	0	1	1 0.0%	2 0.0%	2 0.0%	7 0.0%	2 0.0%	4 25.0%	4 0.0%	8
Antimicropiai Classes	sus	Retail Chickens	0				0	0	0	0	0	1	0	0
	Chickens	HACCP	0.0%	0.0%	5.3% 1	5.9% 1	18.8% 3	0.0%	0.0%	0.0% 0	25.0% 1	6.3% 1	0.0%	5.7% 2
	Ľ	Cecal												0.0%
		Retail Ground Turkeys							0.0%	100.0% 1	100.0% 2	100.0% 1	100.0%	100.0%
	Turkeys	HACCP	100.0%					100.0% 1		100.0% 1				
	-	Cecal												
		Retail Ground Beef		0.0%								0.0%	0.0%	0.0%
	m	HACCP	0.0%	0 8.3%	0.0%	14.3%	23.1%	0.0%	0.0%	0.0%	0.0%	6.7%	25.0%	0.0%
	Cattle	Cecal (Beef)	0	1	0	1	3	0	0	0	0	1	1	0.0%
														0.0%
	_	Cecal (Dairy)				0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%
		Retail Pork Chops	0.0%	0.0%	9.1%	0.0%	0	0	0.0%	10.0%	0 33.3%	0 30.0%	0	0
	Swine	HACCP	0.078	0.078	2	0.078	2	0.0%	0.0 %	10.076	33.376	30.076		
	S	Cecal (Market Hogs)												15.0% 3
		Cecal (Sows)												7.4% 2
3. Resistant to ≥ 4		Humans	2.7% 1	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	9.1% 4	1.9% 1	3.2% 2	2.2%	5.3% 4
Antimicrobial Classes		Retail Chickens	0.0%				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	25.0% 1	0.0%	0.0%	0.0%
	ర్	Cecal	0	U	U	0		U	U	0		0	U	0.0%
	_	Retail Ground Turkeys							0.0%	100.0%	100.0%	100.0%	100.0%	50.0%
	Turkeys	HACCP	0.0%					100.0%	0	100.0%	2	1	3	1
	į	Cecal	0					1		1				
	$\vdash$	Retail Ground Beef		0.0%								0.0%	0.0%	0.0%
		HACCP	0.0%	0 8.3%	0.0%	14.3%	15.4%	0.0%	0.0%	0.0%	0.0%	0 6.7%	0.0%	0.0%
	Cattle		0	1	0	1	2	0	0	0	0	1	0	0.0%
	Ī	Cecal (Beef)												0.0%
	L	Cecal (Dairy)				0.004	0.001	0.007	0.004	0.004	0.004	0.004	0.004	0
		Retail Pork Chops			2.5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Swine	HACCP	0.0%	0.0%	0.0%	0.0% 0	6.3% 1	0.0%	0.0%	0.0% 0	0.0%	10.0% 1		
	, S	Cecal (Market Hogs)												5.0% 1
		Cecal (Sows)												7.4%
1 Starting in 2011, testing included	_		4 120		P. L. 24					C 41	40()			

<sup>&</sup>lt;sup>1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

<sup>2</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

Table 55b. Resistance Patterns among Salmonella Infantis Isolates. 2002-2013<sup>1</sup>

Table 55b. Resistance Patte	erns	among Salmonella	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	37	31	2004	30	2006	26	51	44	53	63	90	76
	Chickens	Retail Chickens HACCP Cecal	1 20	0 27	0 19	0 17	1 16	1 16	5 14	3	3 4	4 16	3 31	8 35 1
	Turkeys	Retail Ground Turkeys HACCP Cecal	0 1	0	0	0	0	0	1 0	1 1	2 0	1 0	3 0	2 0 0
	Cattle	Retail Ground Beef HACCP Cecal (Beef) Cecal (Dairy)	0 26	1 12	0 18	0 7	0 13	0 13	0 4	0	0 5	3 15	1 4	2 7 1 3
	Swine	Retail Pork Chops HACCP <sup>2</sup> Cecal (Market Hogs) Cecal (Sows)	0 20	0 15	0 22	1 27	2 16	5 17	1 15	2 10	1 9	1 10	1	1 20 27
Resistance Pattern		Source	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	9.0%	1.9%	3.2%	2.2%	5.3%
4. Resistant to ≥ 5		Humans	1	0.0%	0.0%	0.0%	0	0	1	4	1	2	2	4
Antimicrobial Classes	St	Retail Chickens	0.0%				0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0% 1	0.0%	0.0%	0.0%
	ō	Cecal												0.0%
		Retail Ground Turkeys							0.0%	100.0%	100.0%	100.0%	100.0%	50.0%
	Turkeys	HACCP	0.0%					100.0%	0	100.0%	2	1	3	1
	Þ		0					1		1				
		Cecal		0.0%								0.0%	0.0%	0.0%
		Retail Ground Beef	0.004	0	0.004	44.00/	45 407	0.004	0.004	0.004	0.004	0	0	0
	Cattle	HACCP	0.0% 0	8.3% 1	0.0% 0	14.3% 1	15.4% 2	0.0% 0	0.0%	0.0% 0	0.0% 0	6.7% 1	0.0% 0	0.0%
	Ö	Cecal (Beef)												0.0%
		Cecal (Dairy)												0.0%
		Retail Pork Chops				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		HACCP	0.0%	0.0%	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	0.0%	10.0%	0	0
	Swine	Cecal (Market Hogs)	0	0	0	0	1	0	0	0	0	1		5.0%
														7.4%
		Cecal (Sows)	0.70/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	4.50/	4.00/	0.00/	0.00/	2
5. At Least ACSSuT <sup>3</sup> Resistant		Humans	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	4.5% 2	1.9% 1	0.0%	0.0% 0	1.3% 1
	Si	Retail Chickens	0.0%				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0% 1	0.0%	0.0%	0.0%
	ō	Cecal												0.0%
		Retail Ground Turkeys							0.0%	100.0%	100.0%	100.0%	100.0%	50.0%
	Turkeys	HACCP	0.0%					0.0%	0	0.0%	2	1	3	1
	Þ	Cecal	0					0		0				
		Retail Ground Beef		0.0%								0.0%	0.0%	0.0%
			0.0%	0 8.3%	0.0%	14.3%	15.4%	0.0%	0.0%	0.0%	0.0%	0 6.7%	0.0%	0.0%
	Cattle	HACCP	0	1	0	1	2	0	0	0	0	1	0	0.0%
	Ĭ	Cecal (Beef)												0.0%
	<u> </u>	Cecal (Dairy)				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Retail Pork Chops	0.004	0.004	0.004	0	0	0	0	0	0	0	0.0%	0.0%
	Swine	HACCP	0.0%	0.0%	0.0%	0.0%	6.3% 1	0.0%	0.0%	0.0%	0.0%	10.0% 1		F 001
	Ś	Cecal (Market Hogs)												5.0%
		Cecal (Sows)												7.4% 2
6. At Least ACT/S <sup>4</sup> Resistant	L	Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3% 1
	s	Retail Chickens	0.0%				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	δ	Cecal	Ť	Ť		Ť								0.0%
		Retail Ground Turkeys							0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Turkeys	HACCP	0.0%					0.0%	0	0.0%	0	U	U	U
	2	Cecal	0					0		0				
	<u> </u>	Retail Ground Beef		0.0%								0.0%	0.0%	0.0%
		HACCP	0.0%	0.0%	0.0%	0.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0 6.7%	0.0%	0.0%
	Cattle		0	0	0	0	1	0	0	0	0	1	0	0.0%
		Cecal (Beef)												0.0%
	<u> </u>	Cecal (Dairy)				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Retail Pork Chops				0	0	0	0	0	0	0	0.0%	0.0%
	Swine	HACCP	0.0%	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0%		
	Š	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												3.7% 1
1 Starting in 2011, testing included r	nine ar	ntimicrobial classes with	the addition	of the macr	olido azithro	myein Roca	ueo rocietan	ce to azithro	mucin is low	(in this case	-19/) anti	miorobiol		•

<sup>1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

<sup>2</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

<sup>3</sup> ACSSUT = ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline

<sup>4</sup> ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole

Table 55c. Resistance Patterns among Salmonella Infantis Isolates, 2002-2013

Table 55c. Resistance Patte	31113 6	anong dannonena	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	37	31	29	30	22	26	51	44	53	63	90	76
	Chickens	Retail Chickens HACCP Cecal	1 20	0 27	0 19	0 17	1 16	1 16	5 14	3	3 4	4 16	3 31	8 35 1
	Turkeys	Retail Ground Turkeys HACCP Cecal	0	0	0	0	0	0 1	1 0	1	2	1 0	3	2 0 0
	Cattle	Retail Ground Beef HACCP Cecal (Beef) Cecal (Dairy)	0 26	1 12	0 18	0 7	0 13	0 13	0 4	0	0 5	3 15	1 4	2 7 1 3
	Swine	Retail Pork Chops HACCP <sup>1</sup> Cecal (Market Hogs) Cecal (Sows)	0 20	0 15	0 22	1 27	2 16	5 17	1 15	2 10	1 9	1 10	1	1 20 27
Resistance Pattern		Source Humans	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.5%	1.9%	0.0%	0.0%	1.3%
7. At Least ACSSuTAuCx <sup>1</sup> Resistant	_	Retail Chickens	0.0%	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	0.0%
	Ş	Cecal	0	0	0	0	0	0	0	0	1	0	0	0.0%
	<u> </u>	Retail Ground Turkeys							0.0%	100.0%	100.0%	100.0%	100.0%	0 50.0%
	Turkeys	HACCP	0.0%					0.0%	0	0.0%	2	1	3	1
	2	Cecal	0					0		0				
		Retail Ground Beef		0.0%								0.0%	0.0%	0.0%
	<u>e</u>	HACCP	0.0%	8.3% 1	0.0%	14.3%	15.4%	0.0%	0.0%	0.0%	0.0%	6.7%	0.0%	0.0%
	Cattle	Cecal (Beef)		,		,	L		Ů					0.0%
		Cecal (Dairy)												0.0%
		Retail Pork Chops				0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Swine	HACCP	0.0%	0.0%	0.0%	0.0% 0	6.3% 1	0.0%	0.0%	0.0% 0	0.0%	10.0% 1		
	Š	Cecal (Market Hogs)												5.0% 1
		Cecal (Sows)												7.4% 2
8. At Least Ceftriaxone and		Humans	0.0%	0.0%	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	1.1% 1	2.6%
Nalidixic Acid Resistant	æ	Retail Chickens	0.0%				0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.00%	0.0% 0	0.0%	0.0% 0	0.0%	0.0%	0.0% 0	0.0% 0	0.0%	0.0%	0.0% 0	0.0%
		Cecal												0.0% 0
	s,	Retail Ground Turkeys							0.0%	0.0% 0	0.0%	0.0%	0.0% 0	0.0%
	Turkeys	HACCP	0.0% 0					0.0%		0.0% 0				
		Cecal												
		Retail Ground Beef		0.0%								0.0%	0.0%	0.0%
	Cattle	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	0	Cecal (Beef)												0.0%
	<u> </u>	Cecal (Dairy)				0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.0%
		Retail Pork Chops	0.0%	0.0%	0.0%	0.0% 0 0.0%	0.0% 0 0.0%	0.0% 0 0.0%	0.0% 0 0.0%	0.0% 0 0.0%	0.0% 0 0.0%	0.0% 0 0.0%	0.0%	0.0%
	Swine	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%
	S	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0.0%

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low <sup>2</sup> ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

Table 56a. Antimicrobial Resistance among Salmonella Heidelberg Isolates, 2002-2013

ear			Humana	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	201
umber of Isolates Te	sted	9	Humans	105	96	92	125	102	98	75	86	62	70	41	60
		Chickens	Retail HACCP	11 403	16 226	31 167	22 283	30 164	14 142	30 94	44 74	21 25	11 28	17 81	28 29
			Cecal												9
		Turkeys	Retail	21	32	37	53	35	41	57	10	17	28	5	17
		Ž.	HACCP Cecal	60	57	46	25	43	23	8	3	14	5	19	6 2
			Retail	0	0	0	0	0	0	1	0	0	0	0	1
		Cattle	HACCP	8	9	1	6	4	0	3	0	2	0	2	2
		Ö	Cecal (Beef) Cecal (Dairy)												0
			Retail	3	0	3	0	4	0	0	1	0	1	1	2
		Swine	HACCP <sup>1</sup>	11	11	4	8	13	2	1	4	5	0		
		Ś	Cecal (Market Hogs) Cecal (Sows)												1
	Antimicrobial														3
ntimicrobial Class	(Resistance Breakpoint)		Isolate Source												
minoglycosides	Gentamicin (MIC ≥ 16 µg/mI)		Humans	3.8% 4	5.2% 5	4.3% 4	6.4% 8	4.9% 5	16.3% 16	14.7% 11	2.3%	8.1% 5	20.0% 14	7.3% 3	21.7 13
	,	s	Retail	45.5% 5	18.8% 3	9.7% 3	13.6% 3	20.0%	7.1% 1	26.7% 8	2.3%	4.8% 1	0.0% 0	0.0%	21.4 6
		Chickens	HACCP	8.9%	7.5%	10.2%	9.2%	9.8%	11.3%	10.6%	23.0%	28.0%	14.3%	13.6%	10.3
		ş	Cecal	36	17	17	26	16	16	10	17	7	4	11	11.1
		-	Retail	23.8%	12.5%	35.1%	37.7%	31.4%	24.4%	57.9%	70.0%	29.4%	78.6%	100.0%	82.4
		ske		5 18.3%	4 12.3%	13 17.4%	20 36.0%	11 32.6%	10 13.0%	33 50.0%	7 33.3%	5 21.4%	22 60.0%	5 57.9%	14 50.0
		Turkeys	HACCP	11	7	8	9	14	3	4	1	3	3	11	3
		Ŀ	Cecal												50.0
			Retail							100.0% 1					100. 1
		<u>a</u>	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		33.3% 1		50.0% 1		50.0% 1	0.0
		Cattle	Cecal (Beef)	Ü											0.0
			Cecal (Dairy)												0
			Retail	100.0%		0.0%		75.0%			0.0%		0.0%	100.0%	0.0
				3 9.1%	0.0%	0.0%	0.0%	3 0.0%	0.0%	100.0%	0.0%	0.0%	0	1	0
		Swine	HACCP	1	0	0	0.070	0	0.070	1	0	0			
		Ś	Cecal (Market Hogs)												0.0
			Cecal (Sows)												33.
	Kanamycin (MIC ≥ 64 μg/ml)		Humans	10.5% 11	8.3% 8	8.7% 8	12.8% 16	8.8% 9	11.2% 11	26.7% 20	20.9% 18	21.0% 13	21.4% 15	9.8% 4	26.1 10
	(WIC 2 04 µg/III)		Retail	36.4%	0.0%	0.0%	0.0%	0.0%	7.1%	10.0%	15.9%	19.0%	0.0%	0.0%	21.
		Chickens	HACCP	3.7%	5.3%	6.0%	6.7%	7.3%	6.3%	8.5%	7 12.2%	32.0%	7.1%	4.9%	3.4
		Chic		15	12	10	19	12	9	8	9	8	2	4	22.:
			Cecal	38.1%	34.4%	27.0%	30.2%	34.3%	56.1%	52.6%	20.0%	76.5%	32.1%	0.0%	35.3
		sk	Retail	8	11	10	16	12	23	30	2	13	9	0	6
		Turkeys	HACCP	30.0% 18	21.1% 12	19.6% 9	44.0% 11	27.9% 12	34.8% 8	50.0% 4	66.7% 2	64.3% 9	20.0% 1	31.6% 6	50.0 3
		-	Cecal												0.0
			Retail							100.0%					0.0
		0	HACCP	37.5%	55.6%	100.0%	50.0%	0.0%		33.3%		50.0%		50.0%	0.0
		Cattle	Cecal (Beef)	3	5	1	3	0		1		1		1	0.0
															C
		<u> </u>	Cecal (Dairy)	0.0%		33.3%		0.0%			100.0%		100.0%	0.0%	100
			Retail	0	465	1		0	15-	45-	1	0.7.1	100.0%	0.0%	100
		Swine	HACCP	54.5% 6	100.0% 11	75.0% 3	75.0% 6	84.6% 11	100.0%	100.0% 1	50.0% 2	60.0% 3			
		Š	Cecal (Market Hogs)												100
			Cecal (Sows)												33.
	Streptomycin	+	Humans	17.1%	12.5%	15.2%	13.6%	11.8%	12.2%	30.7%	23.3%	25.8%	37.1%	17.1%	40.
	(MIC ≥ 64 μg/ml)	$\vdash$	Retail	18 63.6%	12 12.5%	14 22.6%	17 18.2%	12 23.3%	12 21.4%	23 40.0%	20 13.6%	16 14.3%	26 9.1%	0.0%	28.
		ens		7 18.6%	2 17.7%	7 18.0%	4 15.5%	7 10.4%	3 13.4%	12 16.0%	6 27.0%	3 44.0%	1 14.3%	0 12.3%	10.
		Chickens	HACCP	75	40	30	44	17	19	15	20	11	4	10	22.
			Cecal												2
		ဖွ	Retail	57.1% 12	37.5% 12	43.2% 16	47.2% 25	45.7% 16	39.0% 16	71.9% 41	60.0% 6	94.1% 16	92.9% 26	80.0% 4	70. 1
		Turkeys	HACCP	35.0% 21	28.1% 16	21.7% 10	44.0% 11	34.9% 15	26.1% 6	37.5% 3	66.7% 2	57.1% 8	60.0% 3	63.2% 12	50.
		Ĭ	Cecal		,,,	,,,							Ĭ		50.
		$\vdash$	Retail							100.0%					0.0
			HACCP	37.5%	55.6%	100.0%	50.0%	0.0%		33.3%		50.0%		100.0%	50.
		Cattle		3	5	1	3	0		1		1		2	100
			Cecal (Beef)												100
			Cecal (Dairy)												
			Retail	100.0%		33.3% 1		0.0%			100.0% 1		100.0%	0.0%	100
		Эе	HACCP	45.5% 5	100.0% 11	75.0% 3	87.5% 7	69.2% 9	100.0%	100.0%	50.0%	80.0% 4			
		Swine	Cecal (Market Hogs)	,		3		3				-			100
															. 1

<sup>1</sup> in 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 56b. Antimicrobial Resistance among Salmonella Heidelberg Isolates, 2002-2013

Number of Isolates Teste	d	Turkeys Chickens	Retail HACCP Cecal Retail HACCP	105 11 403 21 60	96 16 226 32	92 31 167	125 22 283	102 30 164	98 14 142	75 30 94	86 44 74	62 21 25	70 11 28	41 17 81	60 28 29
			HACCP Cecal Retail HACCP	403	226	167									
			Retail HACCP	21				.54	. 12	Ü-,				J.	
		Turkeys	HACCP		32	07									9
		Turk		60		37	53	35	41	57	10	17	28	5	17
		_	Cecal		57	46	25	43	23	8	3	14	5	19	6 2
			Retail	0	0	0	0	0	0	1	0	0	0	0	1
		Cattle	HACCP	8	9	1	6	4	0	3	0	2	0	2	2
		0	Cecal (Beef) Cecal (Dairy)												0
			Retail	3	0	3	0	4	0	0	1	0	1	1	2
		Swine	HACCP <sup>1</sup>	11	11	4	8	13	2	1	4	5	0		1
		0)	Cecal (Market Hogs) Cecal (Sows)												1 3
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class	Breakpoint) Amoxicillin-		Source	9.5%	5.2%	9.8%	8.8%	9.8%	7.1%	8.0%	20.9%	24.2%	10.0%	22.0%	13.3%
Inhibitor Combinations	Clavulanic Acid		Humans	10	5	9	11	10	7	6	18	15	7	9	8
	(MIC ≥ 32 / 16 μg/ml)	sus	Retail	0.0%	6.3%	9.7% 3	13.6% 3	10.0% 3	21.4% 3	16.7% 5	31.8% 14	19.0% 4	0.0%	0.0%	0.0%
		Chickens	HACCP	8.7% 35	9.3% 21	10.2% 17	21.9% 62	15.9% 26	17.6% 25	8.5% 8	17.6% 13	32.0% 8	17.9% 5	7.4% 6	10.3% 3
		O	Cecal												11.1% 1
		s	Retail	19.0% 4	9.4% 3	5.4% 2	9.4% 5	17.1% 6	9.8% 4	7.0% 4	10.0% 1	23.5% 4	39.6% 11	0.0%	29.4% 5
		Turkeys	HACCP	5.0% 3	0.0%	6.5% 3	0.0%	9.3% 4	26.1% 6	12.5% 1	33.3% 1	35.7% 5	20.0%	10.5%	66.7% 4
		7	Cecal	J		J		7				3			0.0%
			Retail							0.0%					0.0%
		an an	HACCP	50.0%	55.6%	100.0%	83.3%	0.0%		33.3%		50.0%		0.0%	0 50.0%
		Cattle	Cecal (Beef)	4	5	1	5	0		1		1		0	100.0%
															1
			Cecal (Dairy)	0.0%		0.0%		0.0%			100.0%		0.0%	0.0%	0.0%
			Retail	9.1%	9.1%	0.0%	0.0%	7.7%	0.0%	0.0%	1 0.0%	20.0%	0	0	0
		Swine	HACCP	1	1	0.070	0.070	1	0.070	0.070	0.070	1			0.0%
		S	Cecal (Market Hogs)												0
			Cecal (Sows)												66.7% 1
	Cefoxitin (MIC ≥ 32 µg/mI)		Humans	8.6% 9	5.2% 5	7.6% 7	8.8% 11	8.8% 9	7.1% 7	8.0% 6	19.8% 17	24.2% 15	8.6% 6	22.0% 9	15.0% 9
		SL	Retail	0.0%	6.3% 1	9.7% 3	9.1% 2	10.0% 3	21.4%	16.7% 5	31.8% 14	14.3% 3	0.0%	0.0%	0.0%
		Chickens	HACCP	7.4% 30	7.1% 16	10.2% 17	21.6% 61	15.2% 25	16.9% 24	8.5% 8	17.6% 13	32.0% 8	17.9% 5	6.2% 5	6.9% 2
		Ö	Cecal												11.1% 1
			Retail	19.0%	0.0%	5.4% 2	9.4% 5	17.1% 6	9.8%	3.5% 2	10.0%	23.5%	35.7% 10	0.0%	29.4% 5
		Turkeys	HACCP	1.7%	0.0%	6.5%	0.0%	9.3%	17.4%	12.5%	33.3%	35.7%	20.0%	10.5%	66.7%
		Ţ	Cecal		0	3	0	4	4			5		2	0.0%
			Retail							0.0%					0.0%
			HACCP	37.5%	44.4%	100.0%	66.7%	0.0%		33.3%		50.0%		0.0%	0 50.0%
		Cattle		3	4	1	4	0		1		1		0	100.0%
			Cecal (Beef)												1
			Cecal (Dairy)	0.0%		0.0%		0.0%			100.0%		0.0%	2.0%	0.0%
			Retail	0 9.1%	9.1%	0.0%	0.0%	7.7%	0.0%	0.0%	1 0.0%	0.0%	0.070	0	0.070
		Swine	HACCP	1	1	0.0%	0.0%	1.176	0.0%	0.0%	0.0%	0.0%			0.00/
		Ó	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												66.7% 2
	Ceftiofur (MIC ≥ 8 µg/mI)		Humans	7.6% 8	5.2% 5	8.7% 8	8.8% 11	9.8% 10	7.1% 7	8.0% 6	20.9% 18	24.2% 15	8.6% 6	22.0% 9	15.0% 9
		s	Retail	0.0%	6.3%	9.7% 3	9.1% 2	10.0% 3	21.4%	16.7% 5	31.8% 14	19.0% 4	0.0%	0.0%	0.0%
		Chickens	HACCP	8.9% 36	9.3% 21	10.2% 17	21.9% 62	15.9% 26	16.9% 24	8.5% 8	17.6% 13	32.8% 8	17.9% 5	7.4% 6	10.3%
		ర్	Cecal	30	21	- 17	02	20	24	0	13	0	J	0	11.1%
			Retail	19.0%	0.0%	5.4%	9.4%	17.1%	9.8%	3.5%	10.0%	23.5%	39.3%	0.0%	29.4%
		Turkeys	HACCP	5.0%	0.0%	6.5%	0.0%	9.3%	26.1%	12.5%	33.3%	35.7%	20.0%	10.5%	66.7%
		Ţ	Cecal	3	0	3	0	4	6	1	1	5	1	2	0.0%
		-								0.0%					0.0%
			Retail	37.5%	55.6%	100.0%	83.3%	0.0%		0 33.3%		50.0%		0.0%	50.0%
		Φ	HACCP	3	5	1	5	0.078		1		1		0.078	1 100.0%
		att													100.0%
		Cattle	Cecal (Beef)												
		Catt	Cecal (Beef) Cecal (Dairy)												
		Catt		0.0%		0.0%		0.0%			100.0%		0.0%	0.0%	0.0%
			Cecal (Dairy)		9.1%		0.0%		0.0%	0.0%		0.0%			0.0%
		Swine Cattl	Cecal (Dairy) Retail	0 9.1%		0.0%		7.7%			0.0%				0.0%

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Year			Uluman	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	ited	S	Humans	105	96	92	125	102	98	75	86	62	70	41	60
		Chickens	Retail HACCP	11 403	16 226	31 167	22 283	30 164	14 142	30 94	44 74	21 25	11 28	17 81	28 29
		Chic	Cecal	403	220	107	203	104	142	34	/4	23	20	01	9
		ske	Retail	21	32	37	53	35	41	57	10	17	28	5	17
		Turkeys	HACCP	60	57	46	25	43	23	8	3	14	5	19	6
		F	Cecal												2
		e #	Retail Ground Beef HACCP	0 8	0 9	0	0 6	0	0	1 3	0	0 2	0	0 2	1 2
		Cattle	Cecal (Beef)									_			1
			Cecal (Dairy)												0
		e	Retail Pork Chops	3	0	3 4	0	4	0 2	0	1	0	1	1	2
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	11	11	4	8	13	2	'	4	5	0		1
	I Autimianahiai		Cecal (Sows)												3
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class Cephems	Breakpoint) Ceftriaxone		Source	7.6%	5.2%	8.7%	8.8%	9.8%	7.1%	8.0%	20.9%	24.2%	8.6%	22.0%	15.0%
Cephenis	(MIC ≥ 4 μg/mI)		Humans	8	5	8	11	10	7	6	18	15	6	9	9
		S	Retail	0.0%	6.3% 1	9.7% 3	9.1% 2	10.0% 3	21.4% 3	16.7% 5	31.8% 14	23.8% 5	0.0%	0.0%	0.0%
		Chickens	HACCP	8.9% 36	9.3% 21	10.2% 17	21.9% 62	15.9% 26	17.6% 25	8.5% 8	17.6% 13	32.0% 8	17.9% 5	7.4% 6	10.3% 3
		S	Cecal	36	21	17	62	26	25	•	13	•	3	6	11.1%
				19.1%	0.0%	5.4%	9.4%	17.1%	9.8%	3.5%	10.0%	23.5%	39.3%	0.0%	1 29.4%
		λs	Retail	4	0	2	5	6	4	2	1	4	11	0	5
		Turkeys	HACCP	5.0% 3	0.0%	6.5% 3	0.0%	9.3% 4	26.1% 6	12.5% 1	33.3% 1	35.7% 5	20.0%	10.5% 2	66.7% 4
		-	Cecal												0.0%
			Retail							0.0%					0.0%
				37.5%	55.6%	100.0%	83.3%	0.0%		0 33.3%		50.0%		0.0%	50.0%
		Cattle	HACCP	3	5	1	5	0		1		1		0	1
		ď	Cecal (Beef)												100.0%
			Cecal (Dairy)												
			Retail	0.0%		0.0%		0.0%			100.0%		0.0%	0.0%	0.0%
				9.1%	9.1%	0.0%	0.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0	0	0
		Swine	HACCP	1	1	0	0	1	0	0	0	0			0.00/
		S	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												66.7% 2
Folate Pathway Inhibito			Humans	6.7%	7.3%	7.6%	8.0%	4.9%	18.4%	12.0%	7.0%	11.3%	7.1%	2.4%	15.0%
	Sulfisoxazole <sup>2</sup> (MIC ≥ 512 µg/ml)		ı	7 45.5%	7 12.5%	7 12.9%	10 13.6%	5 26.7%	18 7.1%	9 26.7%	2.3%	7 9.5%	5 0.0%	0.0%	9 17.9%
	, ,	sue	Retail	5 9.7%	2 11.1%	4 12.6%	3 10.6%	8 7.9%	1 13.4%	8 12.8%	1 21.6%	2 36.0%	0 17.9%	0 13.6%	5 10.3%
		Chickens	HACCP	39	25	21	30	13	13.4%	12.8%	16	36.0% 9	17.9%	13.6%	3
		O	Cecal												11.1%
			Retail	28.6%	15.6%	37.8%	35.8%	37.1%	26.8%	29.8%	50.0%	35.3%	32.1%	20.0%	29.4%
		Turkeys	HACCP	6 30.0%	5 19.3%	14 26.1%	19 52.0%	13 30.2%	11 34.8%	17 37.5%	5 0.0%	6 28.6%	9 40.0%	21.1%	5 50.0%
		Ę		18	11	12	13	13	8	3	0	4	2	4	3 50.0%
			Cecal												1
			Retail							100.0%					100.0%
		Ф	HACCP	12.5%	44.4%	100.0%	50.0%	0.0%		33.3%		50.0%		50.0%	50.0%
		Cattle	Cecal (Beef)	1	4	1	3	0		1		1		1	100.0%
			` ′												1
			Cecal (Dairy)												
			Retail	100.0%		0.0% 0		100.0% 4			100.0% 1		0.0%	0.0%	0.0%
		9	HACCP	0.0%	0.0%	0.0%	12.5% 1	0.0%	0.0%	100.0%	0.0%	0.0%			
		Swine	Cecal (Market Hogs)	0	0	0	1	0	0	1	0	0			0.0%
			, ,,,												0 33.3%
			Cecal (Sows)												1
	Trimethoprim- Sulfamethoxazole		Humans	1.0%	2.1%	0.0%	0.8% 1	0.0%	0.0%	2.7%	3.5%	0.0%	1.4% 1	0.0%	1.7%
	(MIC ≥ 4 / 76 μg/mI)		Retail	0.0%	0.0%	0.0%	0.0%	6.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	0.7%	0.9%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chic		3	2	0	1	0	0	0	0	0	0	0	0.0%
			Cecal												0
		ø	Retail	0.0%	0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0%	10.7% 3	0.0%	0.0%
		Turkeys	HACCP	3.3% 2	3.5% 2	0.0%	0.0%	0.0%	4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		J.	Cecal				, and the second	Ü							0.0%
		-								0.0%					0.0%
			Retail	0.001	EE 00'	100.001	E0.001	0.007		0		0.001		E0.001	0
		Cattle	HACCP	0.0%	55.6% 5	100.0% 1	50.0% 3	0.0% 0		0.0% 0		0.0% 0		50.0% 1	0.0%
		Cat	Cecal (Beef)												100.0%
			Cecal (Dairy)												1
		-		0.0%		0.0%		100.0%			100.0%		0.0%	0.0%	0.0%
			Retail	0.070		0.070		4			1		0.070	0.070	0.070
					0.09/		0.00/	U U6/	U U6/	0 00/	U U0/	U U0/			
		ine	HACCP	9.1% 1	0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0			
		Swine	HACCP Cecal (Market Hogs)	9.1%		0.0%									0.0%

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low <sup>2</sup> Sulfamethoxazole was tested from 1996-2003 and was replaced by sulfisoxazole in 2004

Year				2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ed	S	Humans	105	96	92	125	102	98	75	86	62	70	41	60
		Chickens	Retail HACCP	11 403	16 226	31 167	22 283	30 164	14 142	30 94	44 74	21 25	11 28	17 81	28 29
		Ş	Cecal		220	107	200	101		0.		20	20	0.	9
		Turkeys	Retail	21	32	37	53	35	41	57	10	17	28	5	17
		Ţ	HACCP Cecal	8	9	1	6	4	0	3	0	2	0	2	2
			Retail Ground Beef	0	0	0	0	0	0	1	0	0	0	0	1
		Cattle	HACCP	8	9	1	6	4	0	3	0	2	0	2	2
			Cecal (Beef) Cecal (Dairy)												1 0
		0	Retail Pork Chops	3	0	3	0	4	0	0	1	0	1	1	2
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	11	11	4	8	13	2	1	4	5	0		1
		0,	Cecal (Narket Hogs) Cecal (Sows)												3
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class Macrolides	Breakpoint) Azithromycin		Source										0.0%	0.0%	0.0%
Macrondes	(MIC ≥32 µg/ml)		Humans										0	0.0%	0.0%
		sue	Retail										0.0%	0.0%	0.0%
		Chickens	HACCP										0.0%	0.0%	0
		L	Cecal										0.00/	0.00/	0.0%
		ys	Retail										0.0%	0.0%	0.0%
		Turkeys	HACCP										0.0%	0.0% 0	0.0%
		Ĺ	Cecal												0.0%
			Retail												0.0%
		Cattle	HACCP											0.0%	0.0%
		Ca	Cecal (Beef)												0.0%
			Cecal (Dairy)												
			Retail										0.0%	0.0%	0.0%
		ЭC	HACCP												
		Swine	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
Penicillins	Ampicillin		Humans	12.4%	10.4%	25.0%	20.0%	18.6%	18.4%	28.0%	27.9%	38.7%	30.0%	26.8%	33.3%
	(MIC ≥ 32 μg/ml)	-	Retail	13 18.2%	10 18.8%	23 25.8%	25 27.3%	19 16.7%	18 21.4%	23.3%	24 31.8%	24 19.0%	0.0%	0.0%	20 3.6%
		Chickens	HACCP	2 14.9%	3 19.0%	8 16.2%	6 25.1%	5 16.5%	3 20.4%	7 13.8%	14 20.3%	40.0%	21.4%	9.9%	1 24.1%
		Chic		60	43	27	71	27	29	13	15	10	6	8	7 33.3%
			Cecal	19.0%	9.4%	13.5%	18.9%	31.4%	53.7%	82.5%	80.0%	70.6%	96.4%	100.0%	3 82.4%
		sk	Retail	4 13.3%	3 3.5%	5 17.4%	10 24.0%	11 37.2%	22 65.2%	47 50.0%	8 66.7%	12 57.1%	27	5	14
		Turkeys	HACCP	8	2	8	6	16	15	4	2	8	3	11	4
		Ĺ	Cecal												50.0% 1
			Retail							0.0%					0.0%
		#	HACCP	50.0% 4	55.6% 5	100.0%	83.3% 5	0.0%		66.7% 2		50.0% 1		0.0%	50.0% 1
		Cattle	Cecal (Beef)												100.0%
			Cecal (Dairy)												
		$\vdash$	Retail	0.0%		0.0%		0.0%			100.0%		0.0%	100.0%	50.0%
		n	HACCP	18.2%	9.1%	0.0%	12.5%	7.7%	0.0%	100.0%	0.0%	20.0%	0	1	1
		Swine	Cecal (Market Hogs)	2	1	0	1	1	0	1	0	1			0.0%
															0 66.7%
Phenicols	Chloramphenicol	-	Cecal (Sows)	1.0%	0.0%	1.1%	0.8%	0.0%	3.1%	1.3%	4.7%	1.6%	4.3%	0.0%	2 6.7%
	(MIC ≥ 32 μg/ml)	-	Humans	1 0.0%	0.0%	1 3.2%	1 0.0%	0.0%	3 7.1%	1.3%	4.7 %	1 0.0%	3 0.0%	0.0%	3.9%
		3ns	Retail	0	0	1	0	0	1	1	0	0	0	0	1
		Chickens	HACCP	1.7% 7	3.1% 7	4.2% 7	3.2% 9	2.4% 4	4.2% 6	4.3% 4	5.4% 4	20.0% 5	3.6% 1	6.2% 5	3.4%
			Cecal												0.0%
		Ľ				F 40/	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.7%	0.0%	0.0%
			Retail	0.0%	0.0%	5.4% 2	0	0					3		
			Retail HACCP				0.0% 0	4.7%	4.3%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys		0 1.7%	0.0%	0.0%	0.0%	4.7%	4.3%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%
			HACCP	0 1.7%	0.0%	0.0%	0.0%	4.7%	4.3%	12.5%	0.0%	0.0%	0.0%	0.0%	0 0.0% 0 0.0%
		Turkeys	HACCP Cecal Retail	0 1.7% 1	0 0.0% 0	2 0.0% 0	0.0% 0	4.7% 2	4.3%	12.5% 1 0.0% 0 0.0%	0.0%	0.0%	0.0%	0.0% 0	0 0.0% 0 0.0% 0 50.0%
		Turkeys	HACCP Cecal Retail HACCP	0 1.7% 1	0 0.0% 0	2 0.0% 0	0.0%	4.7%	4.3%	12.5% 1 0.0% 0	0.0%	0.0%	0.0%	0.0%	0 0.0% 0 0.0% 0 50.0%
			HACCP Cecal Retail HACCP Cecal (Beef)	0 1.7% 1	0 0.0% 0	2 0.0% 0	0.0% 0	4.7% 2	4.3%	12.5% 1 0.0% 0 0.0%	0.0%	0.0%	0.0%	0.0% 0	0 0.0% 0 0.0% 0 50.0%
		Turkeys	HACCP Cecal Retail HACCP Cecal (Beef) Cecal (Dairy)	0 1.7% 1 25.0% 2	0 0.0% 0	2 0.0% 0	0.0% 0	0.0% 0	4.3%	12.5% 1 0.0% 0 0.0%	0.0%	0.0%	0.0%	0.0% 0 50.0% 1	0 0.0% 0 0.0% 0 50.0% 1 100.0%
		Turkeys	HACCP Cecal Retail HACCP Cecal (Beef) Cecal (Dairy) Retail	0 1.7% 1 25.0% 2 0.0% 0	0 0.0% 0 44.4% 4	2 0.0% 0 100.0% 1	0.0% 0 50.0% 3	0.0% 0	4.3%	12.5% 1 0.0% 0 0.0% 0	0.0%	0.0%	0.0%	0.0% 0	0 0.0% 0 0.0% 0 50.0% 1 100.0%
		Cattle	HACCP Cecal Retail HACCP Cecal (Beef) Cecal (Dairy)	0 1.7% 1 25.0% 2	0 0.0% 0	2 0.0% 0 100.0% 1	0.0% 0	0.0% 0.0%	4.3%	12.5% 1 0.0% 0 0.0%	0.0%	0.0%	0.0%	0.0% 0 50.0% 1	0 0.0% 0 0.0% 0 50.0% 1 100.0% 1
		Turkeys	HACCP Cecal Retail HACCP Cecal (Beef) Cecal (Dairy) Retail	0 1.7% 1 25.0% 2 0.0% 0 9.1%	0 0.0% 0 44.4% 4	2 0.0% 0 100.0% 1 0.0% 0 0.0%	0.0% 0 50.0% 3	0.0% 0 0.0% 0 0.0%	4.3% 1	12.5% 1 0.0% 0 0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0 50.0% 1	0 0.0% 0 0.0% 0 50.0% 1 100.0%

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 56e. Antimicrobial Resistance among Salmonella Heidelberg Isolates, 2002-2013

Table 56e. Antimica	obiai Resistance ai	nong .	Samilonena Heidelt	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Te	sted		Humans	105	96	92	125	102	98	75	86	62	70	41	60
		Chickens	Retail	11	16	31	22	30	14	30	44	21	11	17	28
		Chic	HACCP Cecal	403	226	167	283	164	142	94	74	25	28	81	29 9
		ske	Retail	21	32	37	53	35	41	57	10	17	28	5	17
		Turkeys	HACCP	60	57	46	25	43	23	8	3	14	5	19	6
		-	Cecal Retail Ground Beef	0	0	0	0	0	0	1	0	0	0	0	2
		Cattle	HACCP	8	9	1	6	4	0	3	0	2	0	2	2
		ర్ధ	Cecal (Beef)												1
		-	Cecal (Dairy)							_					0
		Swine	Retail Pork Chops HACCP <sup>1</sup>	3 11	0 11	3 4	0 8	4 13	0 2	0	1 4	0 5	0	1	2
		%	Cecal (Market Hogs)												1
	Antimicrobial		Cecal (Sows)												3
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
Quinolones	Ciprofloxacin		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	(MIC ≥ 1 μg/ml)	-	Retail	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		sens		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	0	0	0	0	0	0	0	0	0	0	0	0.0%
		Ĺ	Cecal	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0
		S.	Retail	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0	0.0% 0	0.0%	0.0%	0.0% 0	0.0%
		Turkeys	HACCP	1.7% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		F	Cecal												0.0%
			Retail							0.0%					0.0%
			HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%		0.0%		0.0%	0.0%
		Cattle	Cecal (Beef)	0	0	0	0	0		0		0		0	0.0%
															0
		-	Cecal (Dairy)	0.0%		0.0%		0.0%			0.0%		0.0%	0.0%	0.0%
			Retail	0		0		0			0		0.0%	0.0%	0.0%
		je.	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
		-	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
	Nalidixic Acid		Humans	0.0%	1.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	(MIC ≥ 32 μg/mI)	-	Retail	0.0%	0.0%	0.0%	0.0%	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		ens		0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	3	0	0	0	0	0	0	0	0	0	0	0.0%
		_	Cecal	4.00/	0.0%	0.0%	4.00/	0.00/	0.00/	0.0%	0.00/	0.00/	0.00/	0.00/	0
		s,	Retail	4.8% 1	0	0	1.9% 1	0.0%	0.0% 0	0	0.0%	0.0%	0.0%	0.0%	0.0% 0
		Turkeys	HACCP	1.7% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		-	Cecal												0.0%
			Retail							0.0%					0.0%
		0	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%		0.0%		0.0%	0.0%
		Cattle	Cecal (Beef)	0	0	0	0	0		0		0		0	100.0%
															1
		-	Cecal (Dairy)	0.0%		0.0%		0.0%			0.0%		0.0%	0.0%	0.0%
			Retail	0	0.00/	0	0.00/	0	0.00/	0.00/	0	0.00/	0.070	0.070	0.070
		Swine	HACCP	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0			
		Š	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												33.3% 1
Tetracyclines	Tetracycline (MIC ≥ 16 µg/ml)		Humans	19.0% 20	16.7% 16	19.6% 18	18.4% 23	13.7% 14	22.4% 22	36.0% 27	27.9% 24	22.6% 14	34.3% 24	14.6% 6	33.3% 20
	(WIC 2 TO pg/III)	-	Retail	45.5%	0.0%	6.5%	4.5%	3.3%	7.1%	26.7%	15.9%	19.0%	9.1%	0.0%	26.9%
		Chickens	HACCP	5 11.7%	0 16.4%	2 15.0%	14.5%	12.2%	12.7%	13.8%	7 14.9%	32.0%	10.7%	12.3%	7 3.4%
		Chic		47	37	25	41	20	18	13	11	8	3	10	1 22.2%
		_	Cecal	57.1%	43.8%	70.3%	56.6%	68.6%	70.7%	79.0%	60.0%	82.4%	92.9%	100.0%	2 88.2%
		sk	Retail	12	14	26	30	24	29	45	6	14	26	5	15
		Turkeys	HACCP	70.0% 42	84.2% 48	73.9% 34	64.0% 16	62.8% 27	65.2% 15	87.5% 7	66.7% 2	100.0% 14	80.0% 4	57.9% 11	16.7% 1
		-   -	Cecal												100.0%
			Retail							100.0% 1					100.0% 1
		Φ	HACCP	62.5%	55.6%	100.0%	66.7%	0.0%		33.3%		50.0%		100.0%	50.0%
		Cattle	Cecal (Beef)	5	5	1	4	0		1		1		2	100.0%
															1
		<u> </u>	Cecal (Dairy)	66.7%		100.0%		0.0%			100.0%		100.0%	100.0%	100.0%
			Retail	2	100.007	3	07.50	0	100.007	100.004	1	90.004	1	1	2
		Swine	HACCP	72.7% 8	100.0% 11	75.0% 3	87.5% 7	92.3% 12	100.0% 2	100.0% 1	100.0% 4	80.0% 4			
		Š	Cecal (Market Hogs)												100.0% 1
			Cecal (Sows)												33.3% 1
	-	Cer													

In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 57a. Resistance Patt			2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	105	96	92	125	102	98	75	86	62	70	41	60
	Chickens	Retail Chickens HACCP Cecal	11 403	16 226	31 167	22 283	30 164	14 142	30 94	44 74	21 25	11 28	17 81	28 29 9
	Turkeys	Retail Ground Turkey HACCP Cecal	21 60	32 57	37 46	53 25	35 43	41 23	57 8	10 3	17 14	28 5	5 19	17 6 2
	Cattle	Retail Ground Beef HACCP Cecal (Beef)	0	0 9	0	0 6	0 4	0	1 3	0	0 2	0	0 2	1 2 1
		Cecal (Dairy)  Retail Pork Chops	3	0	3	0	4	0	0	1	0	1	1	0 2
	Swine	HACCP <sup>2</sup> Cecal (Market Hogs) Cecal (Sows)	11	11	4	8	13	2	1	4	5	0		1 3
Resistance Pattern		Source	67.6%	68.8%	56.5%	62.4%	67.6%	58.2%	57.3%	60.5%	53.2%	55.7%	61.0%	46.7%
1. No Resistance Detected	<u> </u>	Humans	71 27.3%	66 62.5%	52 58.1%	78 54.5%	69 50.0%	57 50.0%	43 50.0%	52 61.4%	33 61.9%	39 90.9%	25 100.0%	28 71.7%
	SLI	Retail Chickens	3	10	18	12	15	7	15	27	13	10	17	20
	Chickens	HACCP Cecal	66.5% 268	62.8% 142	68.3% 114	59.4% 168	67.1% 110	65.5% 93	70.2% 66	55.4% 41	36.0% 9	71.4% 20	76.5% 62	65.5% 19 55.6% 5
		Retail Ground Turkey	33.3%	50.0%	16.2%	20.8%	8.6%	9.8%	1.8%	10.0%	0.0%	0.0%	0.0%	0.0%
	Turkeys	HACCP	7 15.0%	16 8.8%	6 15.2%	11 16.0%	23.3%	4 17.4%	0.0%	33.3%	0.0%	0.0%	0 26.3%	0.0%
	μį	Cecal	9	5	7	4	10	4	0	1	0	0	5	0 0.0% 0
		Retail Ground Beef							0.0%					0.0%
	Cattle	HACCP	12.5% 1	44.4% 4	0.0%	0.0% 0	100.0% 4		33.3% 1		50.0% 1		0.0%	50.0% 1
	S	Cecal (Beef)												0.0%
		Cecal (Dairy)												
		Retail Pork Chops	0.0%		0.0%		0.0%			0.0%		0.0%	0.0%	0.0%
		HACCP	0 27.3%	0.0%	0.0%	12.5%	7.7%	0.0%	0.0%	0.0%	0.0%	0	0	0
	Swine		3	0	0	1	1	0	0	0	0			0.0%
		Cecal (Market Hogs)												0 33.3%
		Cecal (Sows)	10.10/	10.10/	10.00/	45.00/	10.70/	17.00/	00.00/	05.00/	00.00/	00.00/	00.00/	1
2. Resistant to ≥ 3		Humans	12.4% 13	10.4% 10	13.0% 12	15.2% 19	12.7% 13	17.3% 17	28.0% 21	25.6% 22	33.9% 21	30.0% 21	26.8% 11	33.3% 20
Antimicrobial Classes	SC	Retail Chickens	45.5% 5	6.3% 1	12.9% 4	13.6% 3	13.3% 4	28.6% 4	33.3% 10	34.1% 15	23.8% 5	0.0%	0.0%	14.3% 4
	Chickens	HACCP	10.9% 44	13.3% 30	15.6% 26	24.4% 69	17.1% 28	20.4% 29	12.8% 12	24.3% 18	36.0% 9	17.9% 5	11.1% 9	10.3% 3
	0	Cecal												11.1% 1
		Retail Ground Turkey	23.8%	12.5% 4	27.0% 10	34.0% 18	40.0% 14	53.7% 22	82.5% 47	70.0% 7	64.7% 11	92.9% 26	100.0% 5	88.2% 15
	Turkeys	HACCP	21.7% 13	14.0%	23.9% 11	36.0% 9	44.2% 19	69.6% 16	50.0%	66.7%	57.1% 8	60.0%	57.9% 11	66.7% 4
	F	Cecal	13		11	9	19	10	4		8	3		50.0%
	<u> </u>	Retail Ground Beef							100.0%					100.0%
		HACCP	37.5%	55.6%	100.0%	83.3%	0.0%		1 66.7%		50.0%		50.0%	1 50.0%
	Cattle		3	5	1	5	0		2		1		1	1 100.0%
		Cecal (Beef)												1
	<u> </u>	Cecal (Dairy)	66 70/		0.0%		0.0%			100.0%		0.0%	100.0%	50.00/
		Retail Pork Chops	66.7%		0		0			1		0.0%	100.0%	50.0% 1
	Swine	HACCP	18.2% 2	9.1% 1	0.0% 0	25.0% 2	7.7% 1	0.0%	100.0% 1	0.0%	0.0%			
	Ś	Cecal (Market Hogs)												0.0% 0
		Cecal (Sows)												66.7% 2
3. Resistant to ≥ 4		Humans	1.9%	0.0% 0	4.3% 4	4.8% 6	2.0%	5.1% 5	13.3% 10	17.4% 15	11.3% 7	4.3% 3	2.4% 1	8.3% 5
Antimicrobial Classes		Retail Chickens	0.0%	0.0%	6.5%	0.0%	0.0%	0.0%	13.3%	9.1%	4.8%	0.0%	0.0%	3.6%
	Chickens	HACCP	3.7%	5.3%	7.8%	6.7%	4.3%	6.3%	4.2%	9.5%	20.0%	14.3%	6.2%	3.4%
	Ğ	Cecal	15	12	13	19	7	9	4	7	5	4	5	1 11.1%
	<u> </u>	Retail Ground Turkey	19.1%	9.4%	10.8%	7.6%	17.1%	14.6%	19.3%	30.0%	29.4%	46.4%	20.0%	1 29.4%
	eys	HACCP	4 6.7%	3 1.8%	4 6.5%	4 12.0%	6 14.0%	6 21.7%	11 25.0%	33.3%	5 35.7%	13 20.0%	1 15.8%	5 16.7%
	Turkeys		4	1	3	3	6	5	2	1	5	1	3	1 0.0%
	<u> </u>	Cecal							0.0%					0.0%
		Retail Ground Beef	25.0%	55.6%	100.0%	50.0%	0.0%		0 33.0%		50.0%		50.0%	0.0%
	Cattle	HACCP	25.0%	55.6%	1	3	0.0%		1		1		1	1 100.0%
		Cecal (Beef)												1
		Cecal (Dairy)												
		Retail Pork Chops	0.0% 0		0.0% 0		0.0% 0			100.0% 1		0.0% 0	0.0% 0	0.0% 0
	Swine	HACCP	9.1% 1	9.1% 1	0.0%	0.0%	7.7% 1	0.0%	100.0% 1	0.0%	0.0%			
	Swi	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												33.3%
1 Starting in 2011, teating included	4		4 1 1 1 1 1 1 1 1		10.1						10()			

Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 57b. Resistance Patte	1115	among Saimonella	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	105	96	92	125	102	98	75	86	62	70	41	60
	Chickens	Retail Chickens HACCP Cecal	11 403	16 226	31 167	22 283	30 164	14 142	30 94	44 74	21 25	11 28	17 81	28 29 9
	Turkeys	Retail Ground Turkey HACCP Cecal	21 60	32 57	37 46	53 25	35 43	41 23	57 8	10 3	17 14	28 5	5 19	17 6 2
	Cattle	Retail Ground Beef HACCP Cecal (Beef)	0 8	0 9	0 1	0 6	0 4	0	1 3	0	0 2	0	0 2	1 2 1
	Swine	Cecal (Dairy)  Retail Pork Chops  HACCP <sup>2</sup> Cecal (Market Hogs)	3 11	0 11	3 4	0	4 13	0 2	0 1	1 4	0 5	1 0	1	0 2
Resistance Pattern	٥,	Cecal (Sows) Source												3
		Humans	1.9%	0.0%	3.3%	1.6%	2.0%	4.1%	6.7%	15.1%	9.7%	4.3%	0.0%	6.7%
4. Resistant to ≥ 5 Antimicrobial Classes		Retail Chickens	0.0%	0.0%	3.2%	0.0%	0.0%	0.0%	5 6.7%	9.1%	6 4.8%	0.0%	0.0%	3.6%
	Chickens	HACCP	2.7%	0 4.4%	3.6%	4.9%	0 4.3%	5.6%	4.2%	8.1%	20.0%	10.7%	6.2%	3.4%
	Chic	Cecal	11	10	6	14	7	8	4	6	5	3	5	1 11.1%
			19.1%	6.3%	5.4%	0.0%	8.6%	2.4%	1.8%	10.0%	23.5%	39.3%	0.0%	1 23.5%
	eys	Retail Ground Turkey	4 3.3%	2 0.0%	2.2%	0.0%	3 9.3%	1 8.7%	1 25.0%	1 33.3%	4 35.7%	11 20.0%	0 10.5%	4 16.7%
	Turkeys	HACCP	2	0	1	0	4	2	2	1	5	1	2	1 0.0%
	<u> </u>	Cecal							0.007					0
		Retail Ground Beef			46**				0.0%					0.0%
	Cattle	HACCP	25.0% 2	55.6% 5	100.0% 1	50.0% 3	0.0% 0		0.0% 0		50.0% 1		0.0% 0	50.0% 1
	Ö	Cecal (Beef)												100.0% 1
	L	Cecal (Dairy)												
		Retail Pork Chops	0.0% 0		0.0%		0.0% 0			100.0%		0.0%	0.0% 0	0.0% 0
	e e	HACCP	9.1%	9.1%	0.0%	0.0%	7.7%	0.0%	100.0%	0.0%	0.0%			
	Swine	Cecal (Market Hogs)	'		0					0	0			0.0%
		Cecal (Sows)												33.3%
		Humans	1.0%	0.0%	1.1%	0.0%	0.0%	3.1%	1.3%	3.5%	1.6%	1.4%	0.0%	6.7%
5. At Least ACSSuT <sup>3</sup> Resistant	_	Retail Chickens	0.0%	0.0%	3.2%	0.0%	0.0%	0.0%	3.3%	0.0%	0.0%	0.0%	0.0%	3.6%
	Chickens	HACCP	0 1.5%	2.2%	1 2.4%	0 2.8%	1.8%	0 4.2%	1 4.2%	0 4.1%	0 16.0%	0 3.6%	0 3.7%	0.0%
	Chic		6	5	4	8	3	6	4	3	4	1	3	0.0%
		Cecal	0.0%	0.0%	5.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.7%	0.0%	0.0%
	eys	Retail Ground Turkey	0	0	2 0.0%	0	0	0 4.3%	0	0.0%	0	3	0	0.0%
	Turkeys	HACCP	1.776	0.078	0.0%	0.0%	2	1	1	0.0%	0.0 %	0.0%	0.0%	0.0%
	<u> </u>	Cecal							0.0%					0.0%
		Retail Ground Beef	12.5%	33.3%	100.0%	50.0%	0.0%		0.0%		0.0%		0.0%	0.0%
	Cattle	HACCP	1	3	1	3	0.0%		0.0%		0.0%		0.0%	1 100.0%
	Ĭ	Cecal (Beef)												1
	<u> </u>	Cecal (Dairy)	0.0%		0.0%		0.0%			0.0%		0.0%	0.0%	0.0%
		Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0 %	0.0%	0.0%
	Swine	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1	0.0%	0.0%			0.0%
	S	Cecal (Market Hogs)												0.0%
		Cecal (Sows)	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.5%	0.0%	1.4%	0.0%	1 1.7%
6. At Least ACT/S <sup>4</sup> Resistant		Humans	1.0%	0.0%	0.0%	0	0	0.0%	0.0%	3	0.0%	1.4%	0.0%	1.7%
	sue	Retail Chickens	0	0	0	0.0%	0.0%	0	0	0.0%	0	0	0	0
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Ľ	Cecal	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	40.701	0.001	0.0%
	ys	Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.7%	0.0%	0.0%
	Turkeys	HACCP	1.7% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cecal							0.651					0.0%
		Retail Ground Beef							0.0%					0.0%
	Cattle	HACCP	0.0%	44.4% 4	100.0%	50.0% 3	0.0% 0		0.0% 0		0.0% 0		0.0%	0.0%
	ű	Cecal (Beef)												100.0% 1
		Cecal (Dairy)												
		Retail Pork Chops	0.0%		0.0%		0.0%			0.0% 0		0.0%	0.0%	0.0% 0
	Swine	HACCP	9.1% 1	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0			
	Š	Cecal (Market Hogs)												0.0% 0
		Cecal (Sows)												0.0% 0
1 Starting in 2011, testing included r	nine ar	ntimicrobial classes with	the addition	of the macr	olide azithroi	mycin. Becar	use resistano	e to azithror	nycin is low (	in this case.	<1%), antimi	icrobial class	resistance (	data from

Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

ACSSuT = ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline

ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole

Table 57c. Resistance Patte	erns a	among Salmonella												
Year Number of Isolates Tested		Humans	2002 105	<b>2003</b> 96	<b>2004</b> 92	<b>2005</b> 125	<b>2006</b> 102	<b>2007</b> 98	<b>2008</b> 75	<b>2009</b> 86	<b>2010</b> 62	<b>2011</b> 70	<b>2012</b> 41	<b>2013</b> 60
Number of Isolates Testeu	Chickens	Retail Chickens HACCP Cecal	11 403	16 226	31 167	22 283	30 164	14 142	30 94	44 74	21 25	11 28	17 81	28 29 9
	Turkeys	Retail Ground Turkey HACCP Cecal	21 60	32 57	37 46	53 25	35 43	41 23	57 8	10 3	17 14	28 5	5 19	17 6 2
	Cattle	Retail Ground Beef HACCP Cecal (Beef) Cecal (Dairy)	0 8	9	0	0 6	0 4	0	1 3	0	0 2	0	0 2	1 2 1 0
	Swine	Retail Pork Chops HACCP <sup>1</sup> Cecal (Market Hogs) Cecal (Sows)	3 11	0 11	3 4	0 8	4 13	0 2	0 1	1 4	0 5	1 0	1	2 1 3
Resistance Pattern		Source	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	0.0%	1.4%	0.0%	1.7%
7. At Least ACSSuTAuCx <sup>2</sup> Resistant	Chickens	Retail Chickens HACCP	1 0.0% 0 1.5% 6	0 0.0% 0 2.2% 5	0 3.2% 1 2.4% 4	0 0.0% 0 2.8% 8	0 0.0% 0 1.8% 3	0 0.0% 0 4.2% 6	0 0.0% 0 2.1% 2	1 0.0% 0 4.1% 3	0 0.0% 0 16.0% 4	1 0.0% 0 3.6% 1	0 0.0% 0 2.5% 2	1 0.0% 0 0.0% 0
	0	Cecal	0.0%	0.0%	5.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.7%	0.0%	0.0% 0 0.0%
	Turkeys	Retail Ground Turkey HACCP	0 1.7%	0.0%	2 0.0%	0.0%	0 4.7%	0 4.3%	0.0%	0.0%	0.0%	3 0.0%	0.0%	0.0%
	T	Cecal	1	0	0	0	2	1	0	0	0	0	0	0 0.0% 0
		Retail Ground Beef							0.0%					0.0%
	Cattle	HACCP	12.5% 1	33.3% 3	100.0% 1	50.0% 3	0.0%		0.0%		0.0%		0.0%	50.0% 1
	రొ	Cecal (Beef)												100.0% 1
		Cecal (Dairy)												
		Retail Pork Chops	0.0%		0.0%		0.0%			0.0%		0.0%	0.0%	0.0%
	Swine	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
	Sw	Cecal (Market Hogs)												0.0% 0 33.3%
		Cecal (Sows)												1
8. At Least Ceftriaxone and		Humans	0.0% 0	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0
Nalidixic Acid Resistant	S.	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.70% 3	0.0% 0	0.0%	0.0% 0	0.0%							
		Cecal												0.0%
	s,	Retail Ground Turkey	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0%	0.0%	0.0% 0	0.0% 0
	Turkeys	HACCP	1.7% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cecal												0.0%
		Retail Ground Beef							0.0%					0.0% 0 0.0%
	Cattle	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%		0.0%		0.0%	0
	0	Cecal (Beef)												100.0% 1
		Cecal (Dairy)	0.0%		0.0%		0.0%			0.0%		0.0%	0.0%	0.0%
		Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0% 0 0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Swine	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.0%
	Ó	Cecal (Market Hogs)												0.0% 0 33.3%
		Cecal (Sows)												აა.3% 1

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low <sup>2</sup> ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

Table 58a, Antimicrobial Resistance among Salmonella Derby Isolates, 2002-201;

Table 58a. Antimicro				2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	ted		Humans	11	5	8	3	3	8	11	13	2	6	7	5
		Chickens	Retail HACCP	0 2	0	0	0 2	0	0	1 0	0	0	0	0	0
		_	Cecal												0
		Turkeys	Retail HACCP	0	0	3 15	1	2 7	1	6 0	5 4	2	2	1	0 2
		T.	Cecal				ŭ	,					·		0
		<u>a</u>	Retail HACCP	0 18	0 13	0 12	0 6	0 2	0	0	0	0	0 2	0	0
		Cattle	Cecal (Beef)	10	13	12	0	2	'	0	0	'	2	U	0
			Cecal (Dairy)					_							2
		Swine	Retail HACCP <sup>1</sup>	0 130	0 46	0 84	0 85	0 56	4 29	0 25	3 24	6 18	2 10	1	5
		Š	Cecal (Market Hogs) Cecal (Sows)												38 24
	Antimicrobial (Resistance		Isolate												27
Antimicrobial Class	Breakpoint)		Source	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	50.00/	0.00/	0.00/	0.00/
Aminoglycosides	Gentamicin (MIC ≥ 16 µg/mI)		Humans	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0% 0	50.0% 1	0.0%	0.0%	0.0% 0
		sus	Retail							100.0% 1					
		Chickens	HACCP	0.0%			0.0%	0.0% 0							0.0% 0
		0	Cecal												
		s/s	Retail			0.0% 0	0.0%	100.0%	0.0%	66.7% 4	60.0% 3	50.0% 1	100.0%	0.0%	
		Turkeys	HACCP	0.0%		20.0%	0.0%	0.0%	0.0%		25.0% 1	0.0%	0.0%	0.0%	0.0% 0
		_	Cecal												
			Retail												
		Cattle	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.0%	0.0%		0.0%
		Ca	Cecal (Beef)												
			Cecal (Dairy)												0.0%
			Retail						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
		ne	HACCP	0.0%	0.0%	0.0% 0	2.4% 2	1.8% 1	0.0%	0.0%	0.0% 0	0.0%	0.0%		
		Swine	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
	Kanamycin (MIC ≥ 64 μg/mI)		Humans	0.0%	0.0%	0.0%	0.0%	33.3% 1	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%
	(	s <sub>o</sub>	Retail	-	-	-			-	0.0%	-	-	-		
		Chickens	HACCP	0.0%			50.0% 1	0.0%							0.0%
		င်	Cecal												
			Retail			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		Turkeys	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	U	0.0%	0.0%	0.0%	0.0%	0.0%
		12	Cecal	0		0	0	0	0		Ů	0	U	U	0
			Retail												
		attle	HACCP	0.0%	15.4% 2	0.0%	33.3%	0.0%	0.0%			0.0%	0.0%		0.0%
		Catt	Cecal (Beef)	U		0	2	0	0			U	0		U
			Cecal (Dairy)												0.0%
			Retail						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
		Φ	HACCP	0.8%	0.0%	0.0%	0.0%	3.6%	3.4%	4.0%	0.0%	0.0%	0.0%	0	U
		Swine	Cecal (Market Hogs)	1	U	0	U	2	1		U	U	U		2.6%
			Cecal (Sows)												0.0%
	Streptomycin		Humans	27.3%	40.0%	50.0%	0.0%	66.7%	62.5%	27.3%	46.2%	50.0%	50.0%	57.1%	40.0%
	(MIC ≥ 64 μg/ml)		Retail	3	2	4	0	2	5	100.0%	6	1	3	4	2
		Chickens	HACCP	0.0%			100.0%	0.0%		1					0.0%
		Chic	Cecal	0			2	0							0
		-	Retail			0.0%	0.0%	0.0%	0.0%	83.3%	60.0%	50.0%	100.0%	0.0%	
		Turkeys	HACCP	0.0%		40.0%	33.3%	14.3%	0.0%	5	25.0%	0.0%	0.0%	0.0%	50.0%
		Tur	Cecal	0		6	1	1	0		1	0	0	0	1
			Retail												
			HACCP	33.3%	46.2%	66.7%	66.7%	50.0%	0.0%			0.0%	0.0%		100.0%
		Cattle	Cecal (Beef)	6	6	8	4	1	0			0	0		1
															0.0%
			Cecal (Dairy)						0.0%		33.3%	50.0%	0.0%	100.0%	0 40.0%
			Retail	67.7%	54.3%	56.0%	61.2%	55.4%	0 48.3%	72.0%	1 58.3%	3 50.0%	0 40.0%	1	2
		Swine	HACCP	88	25	47	52	31	14	18	14	9	40.076		57.9%
		Ó	Cecal (Market Hogs)												22
	1		Cecal (Sows)			f pork carca									50.0% 12

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 58b. Antimicrobial Resistance among Salmonella Derby Isolates, 2002-2013

Table 58b. Antimicro	biai Resistance and	ong	Salmonella Delby	2002	2002-20	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ed		Humans	11	5	8	3	3	8	11	13	2	6	7	5
		kens	Retail	0	0	0	0	0	0	1	0	0	0	0	0
		Chickens	HACCP Cecal	2	0	0	2	1	0	0	0	0	0	0	1 0
		_	Retail	0	0	3	1	2	1	6	5	2	2	1	0
		Turkeys	HACCP	1	0	15	3	7	1	0	4	1	1	1	2
		F	Cecal Retail	0	0	0	0	0	0	0	0	0	0	0	0
		Cattle	HACCP	18	13	12	6	2	1	0	0	1	2	0	1
		ပိ	Cecal (Beef) Cecal (Dairy)												0 2
			Retail	0	0	0	0	0	4	0	3	6	2	1	5
		Swine	HACCP <sup>1</sup>	130	46	84	85	56	29	25	24	18	10		
		Ó	Cecal (Market Hogs) Cecal (Sows)												38 24
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class	Breakpoint) Amoxicillin-		Source	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	7.70/	0.00/	0.00/	44.00/	0.00/
β-Lactam/β-Lactamase Inhibitor Combinations	Clavulanic Acid		Humans	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	7.7% 1	0.0%	0.0%	14.3% 1	0.0%
	(MIC ≥ 32 / 16 μg/ml)	SU	Retail							0.0% 0					
		Chickens	HACCP	0.0%			50.0% 1	0.0% 0							0.0% 0
		O	Cecal												
		s	Retail			66.7% 2	0.0%	0.0%	0.0%	0.0%	40.0% 2	0.0%	0.0%	0.0%	
		Turkeys	HACCP	0.0% 0		0.0% 0	0.0% 0	0.0% 0	0.0%		25.0% 1	0.0% 0	0.0% 0	0.0%	0.0%
		ľ	Cecal												
			Retail												
		Ф	HACCP	5.6%	15.4%	0.0%	16.7%	0.0%	0.0%			0.0%	0.0%		0.0%
		Cattle	Cecal (Beef)	1	2	0	1	0	0			0	0		0
			Cecal (Dairy)												0.0%
			Retail						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
			HACCP	1.5%	2.2%	1.2%	0.0%	0.0%	0.0%	8.0%	0 4.2%	0.0%	0.0%	0	0
		Swine		2	1	1	0	0	0	2	1	0	0		0.0%
		-	Cecal (Market Hogs)												0.0%
Cephems	Cefoxitin	-	Cecal (Sows)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%	0.0%	0.0%	14.3%	0.0%
Серпеніз	(MIC ≥ 32 μg/mI)		Humans	0	0	0	0.070	0	0	0.0%	1	0	0	1	0
		sue	Retail	0.0%			50.0%	0.0%		0.070					0.0%
		Chickens	HACCP	0.0 %			1	0.078							0.0 %
		L	Cecal			CC 70/	0.00/	0.00/	0.00/	0.00/	40.00/	0.00/	0.00/	0.00/	
		s,	Retail			66.7%	0.0%	0.0%	0.0%	0.0%	40.0%	0.0%	0.0%	0.0%	
		Turkeys	HACCP	0.0%		0.0% 0	0.0%	0.0%	0.0%		25.0% 1	0.0%	0.0%	0.0%	0.0%
		Ŀ	Cecal												
			Retail												
		attle	HACCP	5.6% 1	15.4% 2	0.0%	16.7% 1	0.0%	0.0%			0.0%	0.0%		0.0%
		ပ္မ	Cecal (Beef)												
			Cecal (Dairy)												0.0%
			Retail						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
		Э	HACCP	1.5%	2.2%	1.2%	0.0% 0	0.0%	0.0%	8.0% 2	4.2% 1	0.0%	0.0%		
		Swine	Cecal (Market Hogs)	_											0.0%
			Cecal (Sows)												0.0%
	Ceftiofur		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%	0.0%	0.0%	14.3%	0.0%
	(MIC ≥ 8 µg/mI)		Retail	0	0	0	0	0	0	0.0%	1	0	0	1	0
		Chickens	HACCP	0.0%			50.0%	0.0%		0					0.0%
		Chic	Cecal	0			1	0							0
		$\vdash$	Retail			66.7%	0.0%	0.0%	0.0%	0.0%	40.0%	0.0%	0.0%	0.0%	
		eys	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0	2 25.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys		0		0	0	0	0		1	0	0	0	0
		-	Cecal												
			Retail	5.6%	15.4%	0.0%	16.7%	0.0%	0.0%			0.0%	0.0%		0.0%
		Cattle	HACCP	1	2	0.0%	10.7%	0.0%	0.0%			0.0%	0.0%		0.0%
		O	Cecal (Beef)												0.001
			Cecal (Dairy)						0.55		0	0.771	0	0.771	0.0%
			Retail						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
		Swine	HACCP	1.5% 2	2.2% 1	1.2% 1	0.0% 0	0.0% 0	0.0%	8.0% 2	4.2% 1	0.0%	0.0%		
		Š	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
		٠.	lmonella hecause in pri												

In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Year				2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	ited	s	Humans	11	5	8	3	3	8	11	13	2	6	7	5
		Chickens	Retail HACCP	0 2	0	0	0 2	0	0	1 0	0	0	0	0	0
		Chic	Cecal			U		'	U		U	U		U	0
		eys	Retail	0	0	3	1	2	1	6	5	2	2	1	0
		Turkeys	HACCP Cecal	1	0	15	3	7	1	0	4	1	1	1	2
			Retail Ground Beef	0	0	0	0	0	0	0	0	0	0	0	0
		Cattle	HACCP	18	13	12	6	2	1	0	0	1	2	0	1
		O	Cecal (Beef) Cecal (Dairy)												0 2
			Retail Pork Chops	0	0	0	0	0	4	0	3	6	2	1	5
		Swine	HACCP <sup>1</sup>	130	46	84	85	56	29	25	24	18	10		
		S	Cecal (Market Hogs) Cecal (Sows)												38 24
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class	Breakpoint)		Source												
Cephems	Ceftriaxone (MIC ≥ 4 µg/mI)		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7% 1	0.0%	0.0%	14.3% 1	0.0%
		s	Retail							0.0%					
		Chickens	HACCP	0.0%			50.0%	0.0%							0.0%
		S.	Cecal	0			1	0							0
						66.7%	0.0%	0.0%	0.0%	0.0%	40.0%	0.0%	0.0%	0.0%	
		sk	Retail	0.0%		2 0.0%	0.0%	0	0	0	2 25.0%	0.0%	0.0%	0.0%	0.00/
		Turkeys	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%		25.0%	0.0%	0.0%	0.0%	0.0%
		[	Cecal												
			Retail												
			HACCP	5.6%	15.4%	0.0%	16.7%	0.0%	0.0%			0.0%	0.0%		0.0%
		Cattle	Cecal (Beef)	1	2	0	1	0	0			0	0		0
															0.0%
			Cecal (Dairy)												0
			Retail						0.0% 0		0.0% 0	0.0%	0.0% 0	0.0%	0.0%
		ne ne	HACCP	1.5% 2	2.2%	1.2% 1	0.0%	0.0%	0.0%	8.0% 2	4.2% 1	0.0%	0.0%		
		Swine	Cecal (Market Hogs)	_		·	-	-	-	_			-		0.0%
		amothovazolo/	Cecal (Sows)												0.0%
Folate Pathway Inhibito	Sulfamethoxazole/		Humans	45.5%	40.0%	62.5%	33.3%	66.7%	62.5%	36.4%	61.5%	50.0%	50.0%	57.1%	40.0%
	Sulfisoxazole <sup>2</sup> (MIC ≥ 512 µg/mI)		ı	5	2	5	1	2	5	4 100.0%	8	1	3	4	2
	(,	sus	Retail	E0.00/			400.00/	0.00/		1					0.00/
		Chickens	HACCP	50.0% 1			100.0% 2	0.0%							0.0%
		0	Cecal												
			Retail			0.0%	0.0% 0	100.0%	0.0%	66.7% 4	60.0%	50.0% 1	100.0%	0.0%	
		Turkeys	HACCP	0.0%		33.3%	33.3%	14.3%	0.0%	4	75.0%	0.0%	0.0%	0.0%	50.0%
		Ē	Cecal	0		5	1	1	0		3	0	0	0	1
			Retail	07.00/	50.00/	CC 70/	00.70/	50.00/	400.00/			0.00/	0.00/		400.00/
		Cattle	HACCP	27.8% 5	53.8% 7	66.7% 8	66.7% 4	50.0% 1	100.0%			0.0%	0.0% 0		100.0% 1
		ပိ	Cecal (Beef)												
			Cecal (Dairy)												0.0%
			Retail						0.0%		33.3%	50.0%	0.0%	100.0%	40.0%
			HACCP	63.1%	47.8%	57.1%	60.0%	48.2%	55.2%	72.0%	1 62.5%	3 44.4%	40.0%	1	2
		Swine	Cecal (Market Hogs)	82	22	48	51	27	16	18	15	8	4		55.3%
		"													21 50.0%
	Tains oth cond		Cecal (Sows)	0.004	0.004	05.00/	0.004	22.224	0.004	0.007	7.70/	0.004	0.004	44.007	12
	Trimethoprim- Sulfamethoxazole	L	Humans	0.0%	0.0%	25.0% 2	0.0%	33.3% 1	0.0%	0.0%	7.7% 1	0.0%	0.0%	14.3% 1	0.0%
	(MIC ≥ 4 / 76 μg/ml)	s	Retail							0.0% 0					
		Chickens	HACCP	0.0%			0.0%	0.0%							0.0%
		ਨੁੰ	Cecal	0			0	0							0
		-	Retail			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		ske		0.0%		0.0%	0.0%	0.0%	0.0%	0	0.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys	HACCP	0.078		0.076	0.076	0.078	0.076		0.076	0.078	0.078	0.0 %	0.078
			Cecal												
			Retail												
		<u>0</u>	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.0%	0.0%		0.0%
		Cattle	Cecal (Beef)	U	U	U	U	U	U			U	U		
															0.0%
			Cecal (Dairy)						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
			Retail	0.8%	2.2%	0.0%	0.0%	0.0%	0.0%	4.0%	0.0% 0 4.2%	0.0%	0.0%	0.0%	0.0%
				0.0%	2.2%	0.0%				4.0%					
		ję	HACCP	11	1	0	0	0	0	1	1	0	0		
		Swine	Cecal (Market Hogs)	1	1	0	0	0	0	1	1	0	0		0.0% 0 0.0%

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low <sup>2</sup> Sulfamethoxazole was tested from 1996-2003 and was replaced by sulfisoxazole in 2004

Year	obial Resistance am	nong .	Salmonella Derby	2002	2002-20	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	sted		Humans	11	5	8	3	3	8	11	13	2	6	7	5
		Chickens	Retail	0	0	0	0	0	0	1	0	0	0	0	0
		Chic	HACCP Cecal	2	0	0	2	1	0	0	0	0	0	0	0
		eys	Retail	0	0	3	1	2	1	6	5	2	2	1	0
		Turkeys	HACCP Cecal	18	13	12	6	2	1	0	0	1	2	0	1
			Retail Ground Beef	0	0	0	0	0	0	0	0	0	0	0	0
		Cattle	HACCP	18	13	12	6	2	1	0	0	1	2	0	1
			Cecal (Beef) Cecal (Dairy)												0 2
		0	Retail Pork Chops	0	0	0	0	0	4	0	3	6	2	1	5
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	130	46	84	85	56	29	25	24	18	10		38
	1.4		Cecal (Sows)												24
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class Macrolides	Breakpoint) Azithromycin	-	Source Humans										0.0%	0.0%	0.0%
	(MIC ≥32 μg/mI)												0	0	0
		sens	Retail												0.0%
		Chickens	HACCP												0.070
			Cecal										0.0%	0.0%	
		sk	Retail										0	0	0.00/
		Turkeys	HACCP										0.0%	0.0%	0.0%
		Ĺ	Cecal												
			Retail												
		Cattle	HACCP										0.0%		0.0%
		Ča	Cecal (Beef)												
			Cecal (Dairy)												0.0% 0
			Retail										0.0%	0.0%	0.0%
		e	HACCP										0.0%		
		Swine	Cecal (Market Hogs)										0		0.0%
	,		Cecal (Sows)												0.0%
Penicillins	Ampicillin		Humans	9.1%	0.0%	0.0%	0.0%	0.0%	0.0%	9.1%	7.7%	0.0%	16.7%	14.3%	0.0%
	(MIC ≥ 32 μg/mI)	_	Retail	1	0	0	0	0	0	0.0%	1	0	1	1	0
		kens	HACCP	0.0%			50.0%	0.0%		0					0.0%
		Chickens		0			1	0							0
			Cecal			66.7%	0.0%	0.0%	0.0%	16.7%	40.0%	0.0%	0.0%	0.0%	
		ske	Retail	0.0%		6.7%	0.0%	0.0%	0.0%	1	2 50.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys	HACCP	0		1	0	0	0		2	0.070	0	0.070	0.070
		_	Cecal												
			Retail	F C0/	15.4%	0.0%	16.7%	0.0%	0.0%			0.0%	0.0%		0.0%
		Cattle	HACCP	5.6% 1	15.4%	0.0%	16.7%	0.0%	0.0%			0.0%	0.0%		0.0%
		Ö	Cecal (Beef)												
			Cecal (Dairy)												0.0%
			Retail						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
		Swine	HACCP	6.9% 9	2.2% 1	3.6%	1.2% 1	1.8% 1	3.4% 1	8.0% 2	4.2% 1	0.0%	0.0%		
		Š	Cecal (Market Hogs)												2.6%
			Cecal (Sows)												0.0%
Phenicols	Chloramphenicol (MIC ≥ 32 µg/ml)		Humans	0.0%	0.0%	12.5% 1	0.0%	33.3% 1	0.0%	0.0%	0.0%	0.0%	0.0%	28.6% 2	0.0%
		s	Retail							0.0%					
		Chickens	HACCP	0.0%			0.0%	0.0%							0.0%
		S	Cecal	U			U	0							0
		$\vdash$	Retail			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		Turkeys	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%
		TuT	Cecal	0		0	0	0	0	0	1	0	0	0	0
		-	Retail												
				0.0%	7.7%	0.0%	16.7%	0.0%	0.0%			0.0%	0.0%		0.0%
		Cattle	HACCP	0	1	0	1	0	0			0	0		0
			Cecal (Beef)												0.0%
		<u> </u>	Cecal (Dairy)						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
			Retail	2 20/	0.007	0.40/	1 20/	0.007	0	12.00/	0	0	0	0.0%	0.0%
		Swine	HACCP	2.3%	0.0%	2.4%	1.2% 1	0.0%	0.0%	12.0% 3	4.2% 1	0.0%	0.0%		
		Š	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
		t sample products for Sal													

In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 58e. Antimicrobial Resistance among Salmonella Derby Isolates, 2002-2013

Table 58e. Antimicro Year		J.19 1		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ed	S	Humans	11	5	8	3	3	8	11	13	2	6	7	5
		Chickens	Retail HACCP	0 2	0	0	0 2	0	0	1 0	0	0	0	0	0
		Ş	Cecal	_						· ·					0
		Turkeys	Retail	0	0	3	1	2	1	6	5	2	2	1	0
		Turk	HACCP Cecal	1	0	15	3	7	1	0	4	1	1	1	2 0
			Retail Ground Beef	0	0	0	0	0	0	0	0	0	0	0	0
		Cattle	HACCP Cecal (Beef)	18	13	12	6	2	1	0	0	1	2	0	1 0
			Cecal (Dairy)												2
		o.	Retail Pork Chops	0	0	0	0	0	4	0	3	6	2	1	5
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	130	46	84	85	56	29	25	24	18	10		38
			Cecal (Sows)												24
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class Quinolones	Breakpoint) Ciprofloxacin		Source	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	(MIC ≥ 1 μg/mI)		Humans	0	0	0	0	0	0	0.0%	0	0	0	0	0
		ens	Retail	0.0%			0.0%	0.0%		0					0.0%
		Chickens	HACCP	0.070			0.070	0.070							0.070
			Cecal			0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	
		sk	Retail			0.0% 0	0.0% 0	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0% 0	
		Turkeys	HACCP	0.0%		0.0%	0.0% 0	0.0%	0.0%		0.0%	0.0%	0.0%	0.0% 0	0.0% 0
		Ľ	Cecal												
			Retail												
		e	HACCP	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0			0.0% 0	0.0% 0		0.0% 0
		Cattle	Cecal (Beef)	-	-	-	-	-	-			-	-		
			Cecal (Dairy)												0.0%
			Retail						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
			HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0
		Swine	Cecal (Market Hogs)	0	0	0	0	0	0	0	0	0	0		0.0%
		xic Acid													0.0%
	Nalidixic Acid		Cecal (Sows)	0.0%	0.0%	12.5%	0.0%	0.0%	0.0%	0.0%	7.7%	0.0%	0.0%	0.0%	0.0%
	(MIC ≥ 32 μg/mI)		Humans	0	0	1	0	0	0	0.0%	1	0	0	0	0
		sue	Retail	0.0%			0.0%	0.0%		0.070					0.0%
		Chickens	HACCP	0.0%			0.0%	0.0%							0.0%
			Cecal												
		s/	Retail			0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0%	
		Turkeys	HACCP	0.0%		0.0%	0.0% 0	0.0%	0.0% 0		0.0%	0.0%	0.0%	0.0%	0.0%
		-	Cecal												
			Retail												
		ē	HACCP	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0			0.0%	0.0%		0.0% 0
		Cattle	Cecal (Beef)												
			Cecal (Dairy)												0.0%
		-	Retail						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
		Ф	HACCP	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0
		Swine	Cecal (Market Hogs)	0	0	0	1	0	0	0	0	0	0		0.0%
			Cecal (Sows)												0.0%
Tetracyclines	Tetracycline	+	Humans	54.5%	60.0%	50.0%	33.3%	66.7%	62.5%	36.4%	69.2%	0.0%	83.3%	71.4%	0 60.0%
	(MIC ≥ 16 μg/mI)	-	1	6	3	4	1	2	5	4 100.0%	9	0	5	5	3
		ens	Retail	50.0%			100.0%	100.0%		1					0.0%
		Chickens	HACCP	1			2	1							0.078
		Ĺ	Cecal			100.0%	10.0%	100.0%	100.0%	83.3%	10.0%	100.0%	100.0%	100.0%	
		ys	Retail	0.007		3	1	2	1	83.3%	5	2	2	1	100.00
		Turkeys	HACCP	0.0%		20.0%	66.7% 2	85.7% 6	100.0% 1		100.0% 4	100.0% 1	0.0%	0.0%	100.0% 2
		Ľ	Cecal												
			Retail												
		ę	HACCP	38.9% 7	69.2% 9	66.7% 8	66.7% 4	50.0% 1	100.0% 1			0.0%	0.0%		0.0%
		Cattle	Cecal (Beef)		3		7								0
			Cecal (Dairy)												0.0%
		-	Retail						100.0%		33.3%	66.7%	50.0%	100.0%	60.0%
			HACCP	75.4%	60.9%	65.5%	69.4%	67.9%	75.9%	92.0%	1 83.3%	77.8%	70.0%	1	3
		Swine		98	28	55	59	38	22	23	20	14	7		78.9%
		3,	Cecal (Market Hogs)												30 62.5%
			Cecal (Sows)												15

In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 59a. Resistance Patte	erns a	among Salmonella	Derby Is	olates, 20 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	11	5	8	3	3	8	11	13	2	6	7	5
	Chickens	Retail Chickens HACCP Cecal	0 2	0	0	0 2	0 1	0	0	0	0	0	0	0 1 0
	Turkeys	Retail Ground Turkey HACCP Cecal	0	0	3 15	1 3	2 7	1	6 0	5 4	2	2	1 1	0 2 0
	Cattle	Retail Ground Beef HACCP Cecal (Beef)	0 18	0 13	0 12	0 6	0 2	0 1	0	0	0 1	0 2	0	0 1 0
		Cecal (Dairy)  Retail Pork Chops  HACCP <sup>2</sup>	0 130	0 46	0 84	0 85	0 56	4 29	0 25	3 24	6 18	2 10	1	2 5
Resistance Pattern	Swine	Cecal (Market Hogs) Cecal (Sows) Source												38 24
1. No Resistance Detected		Humans	45.5% 5	40.0% 2	0.4%	0.7% 2	0.0%	37.5% 3	45.5% 5	23.1%	50.0%	16.7%	28.6% 2	40.0%
1. NO Resistance Detected		Retail Chickens	3		3			,	0.0%	3				
	Chickens	HACCP	50.0%			0.0%	0.0%		0					100.0%
	Chic	Cecal	1			0	0							1
	_				0.0%	0.0%	0.0%	0.0%	16.7%	0.0%	0.0%	0.0%	0.0%	
	sks	Retail Ground Turkey	400.00/		0 53.3%	0 33.3%	0 14.3%	0	1	0.0%	0	0	0	0.0%
	Turkeys	HACCP	100.0%		8	1	14.3%	0.0%		0.0%	0.0%	1	1	0.0%
		Cecal												
		Retail Ground Beef												
	tle	HACCP	50.0% 9	30.8% 4	33.3% 4	33.3% 2	50.0% 1	0.0%			100.0% 1	100.0%		0.0%
	Cattle	Cecal (Beef)	3	7	7									
		Cecal (Dairy)												100.0%
	_							0.0%		66.7%	33.3%	50.0%	0.0%	2 40.0%
		Retail Pork Chops	23.1%	39.1%	32.1%	30.6%	32.1%	0 24.1%	8.0%	2 16.7%	2 16.7%	1 30.0%	0	2
	Swine	HACCP	30	18	27	26	18	7	2	4	3	3		
	Ó	Cecal (Market Hogs)												21.1% 8
		Cecal (Sows)												37.5% 9
2. Resistant to ≥ 3		Humans	27.3% 3	40.0% 2	0.4% 3	0.0%	0.7% 2	62.5% 5	18.2% 2	46.2% 6	0.0%	50.0% 3	57.1% 4	40.0% 2
Antimicrobial Classes		Retail Chickens		-	0		-		100.0%					
	Chickens	HACCP	0.0%			100.0%	0.0%							0.0%
	Chi	Cecal	0			2	0							0
	<u> </u>				66.7%	0.0%	100.0%	0.0%	66.7%	100.0%	50.0%	100.0%	0.0%	
	ske	Retail Ground Turkey	0.0%		20.0%	0 33.3%	2 14.3%	0.0%	4	5 50.0%	1 0.0%	0.0%	0.0%	50.0%
	Turkeys	HACCP	0		3	1	1	0		2	0	0	0	1
		Cecal												
		Retail Ground Beef												
	attle	HACCP	27.8% 5	38.5% 5	66.7% 8	66.7% 4	50.0% 1	0.0%			0.0%	0.0%		0.0%
	ပိ	Cecal (Beef)												
		Cecal (Dairy)												0.0%
		Retail Pork Chops						0.0%		33.3%	50.0%	0.0%	100.0%	40.0%
	_	HACCP	60.0%	47.8%	57.1%	61.2%	48.2%	0 48.3%	72.0%	1 62.5%	3 38.9%	40.0%	1	2
	Swine	Cecal (Market Hogs)	78	22	48	52	27	14	18	15	7	4		55.3%
														21 50.0%
		Cecal (Sows)	0.00/	0.00/	0.10/	0.00/	0.30/	0.00/	0.00/	7 70/	0.00/	16 70/	20 En/	12
3. Resistant to ≥ 4		Humans	0.0%	0.0%	0.1% 1	0.0%	0.3% 1	0.0%	0.0%	7.7% 1	0.0%	16.7% 1	28.6% 2	0.0%
Antimicrobial Classes	St	Retail Chickens							0.0%					
	Chickens	HACCP	0.0%			50.0% 1	0.0%							0.0%
	ō	Cecal												
		Retail Ground Turkey			66.7%	0.0%	0.0%	0.0%	16.7%	40.0%	0.0%	0.0%	0.0%	
	Turkeys	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	1	50.0%	0.0%	0.0%	0.0%	0.0%
	Ē	Cecal	0		0	0	0	0		2	0	0	0	0
	$\vdash$	Retail Ground Beef												
		HACCP	5.6%	15.4%	0.0%	16.7%	0.0%	0.0%			0.0%	0.0%		0.0%
	Cattle		1	2	0	1	0	0			0	0		0
	Ĺ	Cecal (Beef)												0.0%
	<u> </u>	Cecal (Dairy)						0.004		0.004	0.004	0.004	0.004	0
		Retail Pork Chops						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
	Swine	HACCP	6.9% 9	2.2% 1	2.4% 2	1.2% 1	1.8% 1	3.4% 1	12.0% 3	4.2% 1	0.0%	0.0%		
	Sw	Cecal (Market Hogs)												2.6%
		Cecal (Sows)												0.0%
		timicrobial classes with												0

<sup>&</sup>lt;sup>1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

<sup>2</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

Table 59b. Resistance Patte	1115	among Saimonella	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	11	5	8	3	3	8	11	13	2	6	7	5
	Chickens	Retail Chickens HACCP	0 2	0	0	0 2	0 1	0	1 0	0	0	0	0	0 1
		Cecal  Retail Ground Turkey	0	0	3	1	2	1	6	5	2	2	1	0
	Turkeys	HACCP Cecal	1	0	15	3	7	1	0	4	1	1	1	2
		Retail Ground Beef	0	0	0	0	0	0	0	0	0	0	0	0
	Cattle	HACCP Cecal (Beef) Cecal (Dairy)	18	13	12	6	2	1	0	0	1	2	0	1 0 2
		Retail Pork Chops	0	0	0	0	0	4	0	3	6	2	1	5
	Swine	HACCP <sup>2</sup> Cecal (Market Hogs)	130	46	84	85	56	29	25	24	18	10		38
Resistance Pattern		Cecal (Sows) Source												24
4. Resistant to ≥ 5		Humans	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	7.7% 1	0.0%	0.0%	14.3% 1	0.0%
Antimicrobial Classes	"	Retail Chickens							0.0%					
	Chickens	HACCP	0.0%			50.0%	0.0%		Ů					0.0%
	5	Cecal	0			1	0							0
		Retail Ground Turkey			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Turkeys	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0	0 25.0%	0.0%	0.0%	0.0%	0.0%
	Ē		0		0	0	0	0		1	0	0	0	0
	-	Cecal  Retail Ground Reef												
		Retail Ground Beef	0.0%	15.4%	0.0%	16.7%	0.0%	0.0%			0.0%	0.0%		0.0%
	Cattle	HACCP	0.070	2	0.07.0	1	0	0			0.07.0	0		0
	ĺ	Cecal (Beef)												0.0%
		Cecal (Dairy)												0
		Retail Pork Chops						0.0% 0		0.0%	0.0%	0.0%	0.0%	0.0%
	Swine	HACCP	1.5% 2	2.2% 1	1.2% 1	0.0%	0.0%	0.0%	8.0% 2	4.2% 1	0.0%	0.0%		
	Š	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0.0%
5. At Least ACSSuT <sup>3</sup> Resistant		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.3% 1	0.0%
3. At Least Account Resistant		Retail Chickens	0		0	0		0	0.0%		0	0		0
	Chickens	HACCP	0.0%			0.0%	0.0%		0					0.0%
	S.	Cecal	0			0	0							0
		Retail Ground Turkey			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Turkeys	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0	0 25.0%	0.0%	0.0%	0.0%	0.0%
	Ē	Cecal	0		0	0	0	0		1	0	0	0	0
		Retail Ground Beef												
	_	HACCP	0.0%	0.0%	0.0%	16.7%	0.0%	0.0%			0.0%	0.0%		0.0%
	Cattle		0	0	0	1	0	0			0	0		0
		Cecal (Beef)												0.0%
	<u> </u>	Cecal (Dairy)  Retail Pork Chops						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
			0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	8.0%	0.0%	0.0%	0.0%	0	0
	Swine	HACCP	0	0	1	0	0	0	2	0	0	0		0.0%
	, , , , , , , , , , , , , , , , , , ,	Cecal (Market Hogs)												0.0%
		Cecal (Sows)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6. At Least ACT/S <sup>4</sup> Resistant	<u> </u>	Humans	0.078	0.078	0.0%	0.078	0.0%	0.078	0.0%	0.078	0.0%	0.078	0.0%	0.0%
	ens	Retail Chickens	0.0%			0.0%	0.0%		0.0%					0.0%
	Chickens	HACCP	0.0%			0.0%	0.0%							0.0%
	<u> </u>	Cecal			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	s/vs	Retail Ground Turkey	0.001		0	0	0	0	0.0%	0	0	0	0	0.001
	Turkeys	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
	<u> </u>	Cecal												
		Retail Ground Beef	0.001	0.000	0.004	0.004	0.004	0.004	0.004		0.004	0.004		0.004
	Cattle	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%		0.0%
	O	Cecal (Beef)												
		Cecal (Dairy)												0.0%
		Retail Pork Chops						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
	Swine	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0	4.0% 1	4.2% 1	0.0%	0.0% 0		
	Š	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0.0% 0
Starting in 2011, testing included r	nine ar	ntimicrobial classes with	the addition	n of the mac	rolide azithr	omycin. Bed	ause resista	nce to azith	romycin is lo	ow (in this ca	ise, <1%),			

Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low 3 ACSUT = ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline

ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole

Table 59c. Resistance Patterns among Salmonella Derby Isolates, 2002-2013

Table 59c. Resistance Patte	erns a	among Salmonella												
Year Number of Isolates Tested		Humans	<b>2002</b> 11	<b>2003</b> 5	<b>2004</b> 8	<b>2005</b>	<b>2006</b>	<b>2007</b> 8	<b>2008</b> 11	<b>2009</b> 13	<b>2010</b>	<b>2011</b> 6	<b>2012</b> 7	<b>2013</b> 5
	Chickens	Retail Chickens HACCP Cecal	0 2	0	0	0 2	0 1	0	1 0	0	0 0	0	0	0 1 0
	Turkeys	Retail Ground Turkey HACCP Cecal	0 1	0	3 15	1 3	2 7	1	6	5 4	2 1	2	1	0 2 0
	Cattle	Retail Ground Beef HACCP Cecal (Beef) Cecal (Dairy)	0 18	0 13	0 12	6	0 2	0 1	0	0	0 1	0 2	0	0 1 0 2
Resistance Pattern	Swine	Retail Pork Chops HACCP <sup>1</sup> Cecal (Market Hogs) Cecal (Sows) Source	0 130	0 46	0 84	0 85	0 56	4 29	0 25	3 24	6 18	2 10	1	5 38 24
7. At Least ACSSuTAuCx <sup>2</sup>		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.3% 1	0.0%
Resistant		Retail Chickens	0	0	0	0	0	0	0.0%	0	0	0	1	0
	Chickens	HACCP	0.0%			0.0%	0.0%		0					0.0%
	Ö	Cecal	J			, i	J							
		Retail Ground Turkey			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Turkeys	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0	25.0% 1	0.0%	0.0%	0.0%	0.0%
	-	Cecal												
		Retail Ground Beef												
	H	HACCP	0.0%	0.0%	0.0%	16.7% 1	0.0%	0.0%			0.0%	0.0%		0.0%
	Cat	Cecal (Beef)	J					- J						
		Cecal (Dairy)												0.0%
		Retail Pork Chops						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
	e e	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.0% 2	0.0%	0.0%	0.0%		
	Swine	Cecal (Market Hogs)		-				-	_	-		-		0.0% 0
		Cecal (Sows)												0.0% 0
8. At Least Ceftriaxone and		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nalidixic Acid Resistant	s	Retail Chickens							0.0%					
	Chickens	HACCP	0.0%			0.0%	0.0%							0.0%
	ģ	Cecal												
		Retail Ground Turkey			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Turkeys	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0	0.0%	0.0%	0.0%	0.0%	0.0%
	ř	Cecal	0		0					Ů	0	0	U	0
		Retail Ground Beef												
	<u>e</u>	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.0%	0.0%		0.0%
	Cattle	Cecal (Beef)	0	0	0	0	0	0			0	0		U
		Cecal (Dairy)												0.0%
		Retail Pork Chops						0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
	ā	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	U	U
	Swine	Cecal (Market Hogs)	U	U	U	U	U	U	U	U	U	U		0.0%
		Cecal (Sows)												0.0%
		L												0

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low <sup>2</sup> ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

Table 60a. Antimicrobial Resistance among Salmonella Montevideo Isolates, 2002-201

Year				2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	ted	S	Humans	61	43	50	48	62	51	68	57	58	65	60	53
		Chickens	Retail HACCP	0 30	1 30	3 29	1 62	2 21	6 20	4 13	4 10	0 5	1	4 9	1 4
		ਨੁ	Cecal												0
		Turkeys	Retail	0	2	2	4	8	2	1	4	1	1	1	0
		Ē	HACCP Cecal	2	1	4	3	3	3	1	1	3	2	5	0
			Retail	1	2	0	2	6	3	2	4	1	1	1	4
		Cattle	HACCP Cecal (Beef)	107	64	82	43	63	95	104	59	61	99	84	89 21
			Cecal (Dairy)												56
		Φ.	Retail	0	0	0	0	0	1	0	0	1	0	0	0
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	4	2	0	1	0	2	1	2	0	0		2
	Antimicrobial		Cecal (Sows)												4
	(Resistance		Isolate												
Antimicrobial Class Aminoglycosides	Breakpoint) Gentamicin		Source Humans	1.6%	0.0%	0.0%	27.1%	17.7%	7.8%	2.9%	7.0%	3.4%	0.0%	1.7%	0.0%
	(MIC ≥ 16 μg/ml)		Retail	1	100.0%	33.3%	13 100.0%	0.0%	4 50.0%	0.0%	4 25.0%	2	0.0%	0.0%	0.0%
		kens	HACCP	3.3%	1 30.0%	1 27.6%	11.3%	0 9.5%	3 20.0%	0 53.8%	10.0%	0.0%	0.0%	0 33.3%	0.0%
		Chickens		1	9	8	7	2	4	7	1	0	0	3	0
			Cecal		0.0%	100.0%	0.0%	37.5%	50.0%	0.0%	25.0%	0.0%	0.0%	0.0%	
		ske	Retail	0.0%	0.0%	2 0.0%	0	3	1 66.7%	0	1 100.0%	0	0 50.0%	0 40.0%	
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	2	0.0%	1	3	1	2	
		<u>_</u>	Cecal	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			Retail	0	0		0	0	0	0	0	0	0	0	0
		Cattle	HACCP	0.9% 1	0.0% 0	0.0%	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		ပိ	Cecal (Beef)												0.0% 0
			Cecal (Dairy)												0.0%
			Retail						100.0% 1			0.0%			
		ne	HACCP	0.0%	0.0% 0		0.0%		0.0%	0.0%	0.0%				
		Swine	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
	Kanamycin		Humans	1.6%	0.0%	0.0%	22.9% 11	19.4% 12	7.8% 4	0.0%	1.8%	3.4%	0.0%	0.0%	0.0%
	(MIC ≥ 64 μg/mI)		Retail		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
		Chickens	HACCP	0.0%	0.0%	0.0%	0 8.1%	0 4.8%	10.0%	0 15.4%	0.0%	0.0%	0.0%	22.2%	0.0%
		Chic	Cecal	0	0	0	5	1	2	2	0	0	0	2	0
			Retail		100.0%	50.0%	50.0%	50.0%	50.0%	0.0%	50.0%	100.0%	100.0%	0.0%	
		Turkeys	HACCP	50.0%	0.0%	0.0%	33.3%	0.0%	0.0%	100.0%	0.0%	1 66.7%	1 50.0%	40.0%	
		Ē	Cecal	1	0	0	1	0	0	1	0	2	1	2	
				0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			Retail	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0 3.6%	0 2.2%
		attle	HACCP	1	0	0	0	0	0	0	0	0	0	3	2 0.0%
		Ö	Cecal (Beef)												0
		<u> </u>	Cecal (Dairy)						0.0%			0.0%			1.8%
			Retail	0.00/	0.00/		0.00/		0	0.00/	0.00/	0.0%			
		Swine	HACCP	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%				0.000
		Ś	Cecal (Market Hogs)												0.0%
		_	Cecal (Sows)												0.0% 0
	Streptomycin (MIC ≥ 64 µg/mI)		Humans	3.3% 2	0.0%	4.0% 2	27.1% 13	19.4% 12	7.8% 4	2.9%	5.3% 3	3.4% 2	3.1% 2	1.7% 1	0.0%
		St	Retail		100.0% 1	33.3% 1	100.0% 1	0.0%	50.0% 3	0.0%	25.0% 1		0.0% 0	0.0%	0.0%
		Chickens	HACCP	13.3% 4	36.7% 11	27.6% 8	9.7%	9.5%	10.0%	46.2% 6	10.0%	0.0%	0.0%	33.3%	0.0%
		ò	Cecal												
		-	Retail		100.0%	50.0%	50.0%	75.0% 6	50.0% 1	0.0%	75.0% 3	100.0%	100.0%	0.0%	
		Turkeys	HACCP	50.0%	0.0%	0.0%	33.3%	33.3%	0.0%	100.0%	100.0%	100.0%	50.0%	60.0%	
		12	Cecal		U	U			U			3		3	
		$\vdash$	Retail	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			HACCP	1.9%	1.6%	2.4%	2.3%	1.6%	0.0%	1.0%	1.7%	3.3%	5.1%	2.4%	3.4%
		Cattle	Cecal (Beef)	2	1	2	1	1	0	1	1	2	5	2	3 4.8%
															1 3.6%
		-	Cecal (Dairy)						100.0%			0.0%			2
		- 1	Retail						1			0.078			
				0.00/	0.00/		0.00/		U U0/	0.00/	0.00/				
		vine	HACCP	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%				0.000
		Swine	HACCP Cecal (Market Hogs)												0.0% 0 0.0%

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 60b. Antimicrobial Resistance among Salmonella Montevideo Isolates, 2002-2013

Table 60b. Antimicro	bial Resistance ame	ong	Salmonella Monte	video Is	olates, 2 2003	002-2013 2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ted		Humans	61	43	50	48	62	51	68	57	58	65	60	53
		ens	Retail	0	1	3	1	2	6	4	4	0	1	4	1
		Chickens	HACCP	30	30	29	62	21	20	13	10	5	1	9	4
		_	Cecal Retail	0	2	2	4	8	2	1	4	1	1	1	0
		Turkeys	HACCP	2	1	4	3	3	3	1	1	3	2	5	0
		_	Cecal												0
		ale:	Retail HACCP	1 107	2 64	0 82	2 43	6 63	3 95	2 104	4 59	1 61	1 99	1 84	4 89
		Cattle	Cecal (Beef)	107		02		00	00	101	00	0.	00	0.	21
		-	Cecal (Dairy)											_	56
		Swine	Retail HACCP1	0 4	0 2	0	0	0	1 2	0	0 2	0	0	0	0
		Š	Cecal (Market Hogs)												2
	Antimicrobial		Cecal (Sows)												4
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin- Clavulanic Acid		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5% 1	0.0%	0.0%
initiation combinations	(MIC ≥ 32 / 16 μg/ml)	"	Retail		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
		Chickens	HACCP	3.3%	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		S	Cecal			0	U	0	0	U	U	U	0	0	0
			Retail		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		Ţ	Cecal	0	0	0	0	0	0	0	0	0	0	0	
				0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			Retail	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0 1.7%	0.0%	0 4.0%	0 2.4%	0.0%
		Cattle	HACCP	2	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	0.0%	4.0%	2.4%	2.2% 2 4.8%
		0	Cecal (Beef)												1
			Cecal (Dairy)												3.6% 2
			Retail						0.0% 0			0.0% 0			
		Swine	HACCP	0.0%	0.0%		0.0% 0		0.0%	0.0%	0.0%				
		Š	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
Cephems	Cefoxitin (MIC ≥ 32 µg/mI)		Humans	0.0%	0.0%	0.0%	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	1.5% 1	0.0%	0.0%
	(WIIO E OZ pg/III)	"	Retail		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
		Chickens	HACCP	3.3%	3.3%	0.0%	0.0%	4.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		S	Cecal	1	1	0	0	1	0	0	0	0	0	0	0
			Retail		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		Ţ	Cecal	0	0	0	0	0	0	0	0	0	0	0	
				0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			Retail	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0.0%	0 4.0%	2.4%	0 2.2%
		attle	HACCP	2	0	0	0.070	0	0.070	0.070	1	0.070	4	2	2 4.8%
		0	Cecal (Beef)												1
			Cecal (Dairy)						0.00/			0.00/			3.6% 2
			Retail						0.0%			0.0%			
		Swine	HACCP	0.0%	0.0%		0.0% 0		0.0%	0.0% 0	0.0% 0				
		Š	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
	Ceftiofur (MIC ≥ 8 μg/mI)		Humans	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	1.5% 1	0.0%	0.0%
		s	Retail		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
		Chickens	HACCP	3.3%	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		ਨੁੰ	Cecal												J
			Retail		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		Ţ	Cecal	0	0	0	0	0	0	0	0	0	0	0	
			Retail	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
				0 1.9%	0.0%	0.0%	0.0%	0 1.6%	0.0%	0.0%	0 1.7%	0.0%	0 4.0%	0 2.4%	0 2.2%
		Cattle	HACCP	2	0	0	0	1	0	0	1	0	4	2	4.8%
			Cecal (Beef)												1 3.6%
			Cecal (Dairy)						0.004			0.004			2
			Retail						0.0%			0.0%			
		Swine	HACCP	0.0% 0	0.0%		0.0%		0.0%	0.0% 0	0.0% 0				
		Sw.	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
In 2012 and 2012 ESIS	did not sample products for	or Sa	Imonella hecause in nr	or years th	e percent o	of nork care	ace campl	os nositivo	for Salmor	ella was ci	neietently	low			

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 60c. Antimicrobial Resistance among Salmonella Montevideo Isolates, 2002-2013

Year	-1-1		Home	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Te	sted	SI	Humans	61	43	50	48	62	51	68	57	58	65	60	53
		Chickens	Retail HACCP	0 30	1 30	3 29	1 62	2 21	6 20	4 13	4 10	0 5	1	4 9	1 4
			Cecal												0
		Turkeys	Retail HACCP	0 2	2	2 4	4 3	8	2 3	1	4	1 3	1 2	1	0
		Tur	Cecal		1	4	3	3	3	1	1	3	2	5	0
			Retail Ground Beef	1	2	0	2	6	3	2	4	1	1	1	4
		Cattle	HACCP	107	64	82	43	63	95	104	59	61	99	84	89
			Cecal (Beef) Cecal (Dairy)												21 56
		n	Retail Pork Chops	0	0	0	0	0	1	0	0	1	0	0	0
		Swine	HACCP <sup>1</sup>	4	2	0	1	0	2	1	2	0	0		2
		0,	Cecal (Market Hogs) Cecal (Sows)												4
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class Cephems	Breakpoint) Ceftriaxone	-	Source	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%	0.09
<b>серпеніз</b>	(MIC ≥ 4 μg/ml)		Humans	0.078	0	0	0	0	0	0	0	0.078	1	0	0
		SL	Retail		0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%		0.0%	0.0% 0	0.09
		Chickens	HACCP	3.3% 1	3.3% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.09
		ò	Cecal					-			-	-			
			Retail		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	
		eys		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		Turkeys	HACCP	0	0	0	0	0	0	0	0	0	0	0	
		<u> </u>	Cecal	0.00:	0.051		0.000	0.00:	0.00:	0.051	0.000	0.00:	0.051	0.051	
			Retail	0.0%	0.0%		0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0% 0	0.09
		<b>⊕</b>	HACCP	1.9% 2	1.6% 1	0.0%	0.0%	0.0%	0.0%	0.0%	1.7% 1	0.0%	4.0% 4	2.4%	2.29
		Cattle	Cecal (Beef)												4.89
			Cecal (Dairy)												3.69
									0.0%			0.0%			2
			Retail	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%	0			
		Swine	HACCP	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%				
		Š	Cecal (Market Hogs)												0.0
			Cecal (Sows)												0.0
olate Pathway Inhibit			Humans	1.6%	0.0%	0.0%	25.0%	19.4%	7.8%	4.4%	7.0%	3.4%	3.1%	1.7%	1.9
	Sulfisoxazole <sup>2</sup> (MIC ≥ 512 µg/mI)		Retail	1	100.0%	0.0%	12 100.0%	12 0.0%	50.0%	0.0%	75.0%	2	0.0%	0.0%	0.0
		cens		10.0%	16.7%	0 24.1%	9.7%	0 14.3%	3 10.0%	0 23.1%	3 10.0%	0.0%	0.0%	0 11.1%	0.0
		Chickens	HACCP	3	5	7	6	3	2	3	1	0	0	1	0
			Cecal												
		s	Retail		0.0%	0.0%	0.0%	12.5% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	33.3% 1	0.0%	0.0%	0.0%	66.7% 2	0.0%	60.0%	
		Ĕ	Cecal	Ü				·				_		Ů	
			Retail	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0
				0.9%	0.0%	1.2%	0.0%	1.6%	1.1%	1.9%	0 1.7%	0.0%	0 4.0%	2.4%	2.29
		Cattle	HACCP	1	0	1	0	1	1	2	1	0	4	2	4.89
			Cecal (Beef)												1
			Cecal (Dairy)												5.4 <sup>4</sup>
			Retail						100.0% 1			0.0%			
		e	HACCP	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%	,			
		Swine	Cecal (Market Hogs)	0	0		0		0	0	0				0.0
			Cecal (Sows)												0.0
	Trimethoprim-	+		0.0%	0.0%	2.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%	1.9
	Sulfamethoxazole	<u> </u>	Humans	0.0%	0	1	0	1	0	0	0	0.0%	1	0	1
	(MIC ≥ 4 / 76 μg/ml)	us	Retail		0.0%	0.0% 0	0.0% 0	0.0%	0.0%	0.0%	0.0%		0.0% 0	0.0%	0.0
		Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0
		Ö	Cecal												
		$\vdash$	Retail		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		Ţ		0	0	0	0	0	0	0	0	0	0	0	
		_	Cecal	0.004	0.004		0.00/	0.007	0.007	0.007	0.00/	0.007	0.0%	0.007	0.0
			Retail	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0.0%	0.0
		#	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	1.1% 1	1.0%	0.0%	0.0%	0.0%	0.0%	0.0
		Cattle	Cecal (Beef)												0.0
			Cecal (Dairy)												1.8
		$\vdash$	Retail						0.0%			0.0%			1
				0.0%	0.0%		0.0%		0.0%	0.0%	0.0%	0			
		Swine	HACCP	0	0		0		0	0	0				0.0
		Q	Cecal (Market Hogs)												0
	i		Cecal (Sows)												0.0

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low <sup>2</sup> Sulfamethoxazole was tested from 1996-2003 and was replaced by sulfisoxazole in 2004

Table 60d. Antimicrobial Resistance among Salmonella Montevideo Isolates, 2002-2013

	obiai itesistance an	iong .	Salmonella Monte												
Year Number of Isolates Tes	ted		Humans	<b>2002</b> 61	<b>2003</b> 43	<b>2004</b> 50	<b>2005</b> 48	<b>2006</b> 62	<b>2007</b> 51	<b>2008</b> 68	<b>2009</b> 57	<b>2010</b> 58	<b>2011</b> 65	<b>2012</b> 60	<b>2013</b> 53
realities of isolates les	ned	su	Retail	0	1	3	1	2	6	4	4	0	1	4	1
		Chickens	HACCP	30	30	29	62	21	20	13	10	5	1	9	4
			Cecal												0
		Turkeys	Retail	0	2	2	4	8	2	1	4	1	1	1	0
		Ţ	HACCP	107	64	82	43	63	95	104	59	61	99	84	89
		Ė	Cecal			0									21
		e t	Retail Ground Beef HACCP	1 107	2 64	0 82	2 43	6 63	3 95	2 104	4 59	1 61	1 99	1 84	4 89
		Cattle	Cecal (Beef)									-			21
			Cecal (Dairy)												56
		Φ	Retail Pork Chops	0	0	0	0	0	1	0	0	1	0	0	0
		Swine	HACCP <sup>1</sup>	4	2	0	1	0	2	1	2	0	0		2
		"	Cecal (Market Hogs) Cecal (Sows)												4
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class	Breakpoint)		Source												
Macrolides	Azithromycin (MIC ≥32 µg/mI)		Humans										0.0%	0.0%	0.0%
	(mio 252 pg/m)		Retail										0.0%	0.0%	0.0%
		kens	HACCP										0.0%	0.0%	0.0%
		Chickens											0	0	0
			Cecal										0.0%	0.0%	
		ş	Retail										0	0	
		Turkeys	HACCP										0.0%	0.0%	
		F	Cecal												
			Retail										0.0%	0.0%	0.0%
			HACCP										0.0%	0.0%	0.0%
		Cattle											0	0	0.0%
		0	Cecal (Beef)												0
			Cecal (Dairy)												0.0%
			Retail												
		e.	HACCP												
		Swine	Cecal (Market Hogs)												0.0%
															0.0%
Penicillins	Ampicillin	_	Cecal (Sows)	3.3%	0.0%	2.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%	0.0%
rememins	(MIC ≥ 32 μg/mI)		Humans	2	0	1	0	1	0	0	0	0.070	1	0	0
		S	Retail		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0% 1		0.0%	0.0%	0.0%
		Chickens	HACCP	3.3% 1	3.3% 1	0.0% 0	1.6% 1	0.0%	0.0%	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0
		S	Cecal			0	-	-	0	0	0	0	0	0	U
		-			0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	
		sk	Retail	50.00/	0	0	2	0	0	0	0	0	0	1	
		Turkeys	HACCP	50.0% 1	0.0% 0	0.0%	0.0%	33.3% 1	0.0%	0.0%	0.0%	33.3% 1	50.0% 1	20.0%	
		-	Cecal												
			Retail	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			HACCP	1.9%	1.6%	0.0%	0.0%	0.0%	0.0%	1.0%	1.7%	0.0%	4.0%	2.4%	2.2%
		Cattle		2	1	0	0	0	0	1	1	0	4	2	2 4.8%
		0	Cecal (Beef)												1
			Cecal (Dairy)												3.6% 2
			Retail						0.0%			0.0% 0			
		Φ.	HACCP	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%	Ü			
		Swine		0	0		0		0	0	0				0.0%
		0,	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0
Phenicols	Chloramphenicol (MIC ≥ 32 µg/mI)		Humans	1.6% 1	0.0%	0.0%	0.0%	1.6% 1	0.0%	0.0%	0.0%	0.0%	1.5% 1	0.0%	0.0%
	" " "		Retail		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
		Chickens	HACCP	3.3%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Shic		1	0	0	1	0	0	0	0	0	0	0	0
		<u> </u>	Cecal		0.007	0.004	0.001	0.004	0.001	0.001	0.001	0.004	0.004	0.001	
		ο	Retail		0.0%	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		ī	Cecal	Ť	Ť	Ť	Ť	Ť	Ť	Ť	Ť	Ť	Ť	Ť	
		-	Retail	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
				0.9%	0.0%	1.2%	0.0%	0 1.6%	0.0%	0 1.0%	0 1.7%	0.0%	0 4.0%	0 2.4%	0 2.2%
		Cattle	HACCP	1	0.0%	1.2%	0.0%	1.6%	0.0%	1.0%	1.7%	0.0%	4.0%	2.4%	2
		రొ	Cecal (Beef)												4.8% 1
			Cecal (Dairy)												3.6%
		-	Retail						0.0%			0.0%			2
				0.0%	0.0%		0.0%		0.0%	0.0%	0.0%	0			
		Swine	HACCP	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%				
		Š	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
			monella hecause in pri												0

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Year	bial Resistance am	nong (	Salmonella Monte	video Iso 2002	olates, 2	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	ted	E	Humans	61	43	50	48	62	51	68	57	58	65	60	53
		Chickens	Retail	0	1	3	1	2	6	4	4	0	1	4	1
		Chic	HACCP Cecal	30	30	29	62	21	20	13	10	5	1	9	4 0
		eys	Retail	0	2	2	4	8	2	1	4	1	1	1	0
		Turkeys	HACCP Cecal	2	1	4	3	3	3	1	1	3	2	5	0
			Retail Ground Beef	1	2	0	2	6	3	2	4	1	1	1	4
		Cattle	HACCP	107	64	82	43	63	95	104	59	61	99	84	89
			Cecal (Beef) Cecal (Dairy)												21 56
			Retail Pork Chops	0	0	0	0	0	1	0	0	1	0	0	0
		Swine	HACCP <sup>1</sup>	4	2	0	1	0	2	1	2	0	0		2
		0,	Cecal (Market Hogs) Cecal (Sows)												4
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class Quinolones	Breakpoint) Ciprofloxacin		Source	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Quilloiones	(MIC ≥ 1 μg/ml)		Humans	0.070	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0.0%	0.0%	0.0%
		sue	Retail	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Ľ	Cecal												
		ş	Retail		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	
		Ĺ	Cecal												
			Retail	0.0%	0.0% 0		0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0
		e te	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail						0.0%			0.0%			
		Φ.	HACCP	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%	0			
		Swine	Cecal (Market Hogs)	0	0		0		0	0	0				0.0%
			Cecal (Sows)												0.0%
	Nalidixic Acid	+	Humans	0.0%	0.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%	1.9%
	(MIC ≥ 32 μg/mI)		Retail	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0.0%	0.0%	0.0%
		sue	HACCP	0.0%	0.0%	0 3.4%	0 4.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens		0	0	1	3	0	0	0	0	0	0	0	0
		-	Cecal		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		ske	Retail	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		Turkeys	HACCP	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.076	0.070	0.070	0.070	
			Cecal	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			Retail	0	0	0.00/	0	0	0	0	0	0	0	0	0
		Sattle	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Ü	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail						0.0%			0.0%			
		Swine	HACCP	0.0%	0.0% 0		0.0%		0.0%	0.0%	0.0%				
		Sw	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0% 0
Tetracyclines	Tetracycline (MIC ≥ 16 μg/ml)		Humans	3.3%	2.3% 1	2.0% 1	25.0% 12	19.4% 12	7.8% 4	1.5% 1	1.8% 1	5.2% 3	6.2% 4	5.0% 3	0.0% 0
	. ,,	s	Retail		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0% 1		0.0%	0.0%	0.0%
		Chickens	HACCP	10.0%	13.3%	3.4%	4.8%	9.5%	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		5	Cecal	Ť			Ť	_		Ť	Ť	Ť	Ť	Ť	Ť
			Retail		0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
		Turkeys	HACCP	50.0%	0.0%	25.0% 1	0.0%	33.3%	0.0%	0.0%	0.0%	66.7%	0.0%	60.0%	
		Ţ	Cecal		U		0	-	U	0	0	2	0	3	
		-	Retail	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%
			HACCP	11.2%	12.5%	9.8%	9.3%	4.8%	7.4%	7.7%	6.8%	0 11.5%	0 17.2%	21.4%	11.2%
		Cattle	Cecal (Beef)	12	8	8	4	3	7	8	4	7	17	18	10 19.0%
		1													4 8.9%
			Cecal (Dairy)							0.0%			0.0%		5
			Retail	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%		0		
		Swine	HACCP	0.078	0.078		0.078		0.078	0.078	0.078				0.0%
		S	Cecal (Market Hogs)												0
			Cecal (Sows)												0.0%

In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 61a. Resistance Patt Year			2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	61	43	50	48	62	51	68	57	58	65	60	53
	Chickens	Retail Chickens HACCP Cecal	0 30	1 30	3 29	1 62	2 21	6 20	4 13	4 10	0 5	1	4 9	1 4 0
	Turkeys	Retail Ground Turkey HACCP Cecal	0 2	2	2 4	4 3	8	2	1 1	4 1	1 3	1 2	1 5	0 0 0
	Cattle	Retail Ground Beef HACCP	1 107	2 64	0 82	2 43	6 63	3 95	2 104	4 59	1 61	1 99	1 84	4 89
	S C	Cecal (Beef) Cecal (Dairy)	2											21 56
	Swine	Retail Pork Chops HACCP <sup>2</sup> Cecal (Market Hogs) Cecal (Sows)	0 4	0 2	0	0 1	0	1 2	0 1	0 2	0	0	0	0 2 4
Resistance Pattern		Source												
1. No Resistance Detected		Humans	91.8% 56	97.7% 42	0.9% 44	0.7% 34	79.0% 49	92.2% 47	95.6% 65	93.0% 53	94.8% 55	93.8% 61	93.3% 56	96.2% 51
	kens	Retail Chickens	83.3%	0.0% 0 56.7%	66.7% 2 65.5%	0.0% 0 87.1%	100.0% 2 76.2%	50.0% 3 80.0%	100.0% 4 46.2%	25.0% 1 90.0%	100.0%	100.0% 1 100.0%	100.0% 4 66.7%	100.0% 1 100.0%
	Chickens	HACCP	25	17	19	54	16	16	6	9	5	1	6	4
		Cecal												
	s,	Retail Ground Turkey		0.0% 0	0.0% 0	50.0% 2	25.0% 2	50.0% 1	100.0% 1	0.0%	0.0%	0.0%	0.0%	
	Turkeys	HACCP	50.0% 1	100.0%	75.0% 3	66.7%	33.3% 1	33.3% 1	0.0%	0.0%	0.0%	50.0% 1	40.0%	
	-	Cecal	100.0%	100.0%		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	50.0%
		Retail Ground Beef	1	2		2	6	3	2	4	1	1	1	2
	Cattle	HACCP	88.8% 95	85.9% 55	90.2% 74	90.7% 39	95.2% 60	92.6% 88	92.3% 96	93.2% 55	86.9% 53	81.8% 81	78.6% 66	88.8% 79
	ő	Cecal (Beef)												81.0% 17
		Cecal (Dairy)												89.3% 50
		Retail Pork Chops						0.0%			0.0%			
		HACCP	100.0%	100.0%		100.0%		100.0%	100.0%	100.0%	0			
	Swine	Cecal (Market Hogs)	4	2		1		2	1	2				100.0%
														2 100.0%
		Cecal (Sows)	4.60/	0.00/	0.00/	0.20/	0.2%	7.00/	0.00/	4.00/	2.49/	2.49/	0.0%	4 0.0%
2. Resistant to ≥ 3		Humans	1.6% 1	0.0%	0.0% 0	0.3% 12	12	7.8% 4	0.0%	1.8% 1	3.4% 2	3.1% 2	0.0% 0	0
Antimicrobial Classes	S	Retail Chickens		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0% 1		0.0%	0.0%	0.0%
	Chickens	HACCP	6.7% 2	3.3%	0.0%	6.5% 4	4.8% 1	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Ö	Cecal												
		Retail Ground Turkey		0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	
	Turkeys	HACCP	50.0%	0.0%	0.0%	0.0%	33.3%	0.0%	0.0%	0.0%	66.7%	0.0%	60.0%	
	Ē	Cecal	1	0	0	0	1	0	0	0	2	0	3	
	_		0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Retail Ground Beef	0	0	1.2%	0	0	0.0%	0	0	0.0%	0	0 2.4%	0 2.2%
	attle	HACCP	2	1	1.270	0.070	1.070	0.076	1.070	1	0.070	4	2	2
	O	Cecal (Beef)												4.8% 1
		Cecal (Dairy)												3.6%
		Retail Pork Chops							0.0%			0.0%		
	e.	HACCP	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%				
	Swine	Cecal (Market Hogs)	U	U		0				U				0.0%
		Cecal (Sows)												0.0%
		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%	0.0%
3. Resistant to ≥ 4 Antimicrobial Classes	-	1	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0 25.0%	0	1 0.0%	0.0%	0.0%
	ens	Retail Chickens	3.3%	0 3.3%	0.0%	0 4.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	1	1	0	3	0	0	0	0.070	0	0	0	0
		Cecal												
	စ္	Retail Ground Turkey		0.0% 0	0.0% 0	0.0% 0	0.0%	0.0%	0.0%	0.0% 0	0.0% 0	0.0%	0.0% 0	
	Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0	33.3% 1	0.0%	20.0%	
	L	Cecal												
		Retail Ground Beef	0.0%	0.0%		0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	te	HACCP	1.9%	1.6%	1.2%	0.0%	1.6%	0.0%	1.0%	1.7%	0.0%	4.0%	2.4%	2.2%
	Cattle	Cecal (Beef)												4.8%
		Cecal (Dairy)												3.6%
	H	Retail Pork Chops						0.0%			0.0%			2
			0.0%	0.0%		0.0%		0.0%	0.0%	0.0%	0			
	Swine	HACCP	0	0		0		0	0	0				0.0%
	U)	Cecal (Market Hogs)												0
		Cecal (Sows)												0.0% 0

<sup>&</sup>lt;sup>1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

<sup>2</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

Table 61b. Resistance Patterns among Salmonella Montevideo Isolates, 2002-2013<sup>1</sup>

Table 61b. Resistance Patte	erns a	among Salmonella	Montevi 2002	deo Isolat 2003	es, 2002-2 2004	2013'	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	61	43	50	48	62	51	68	57	58	65	60	53
	Chickens	Retail Chickens HACCP Cecal	0 30	1 30	3 29	1 62	2 21	6 20	4 13	4 10	0 5	1	4 9	1 4 0
	Turkeys	Retail Ground Turkey HACCP Cecal	0 2	2	2 4	4 3	8	2	1 1	4 1	1 3	1 2	1 5	0
	Cattle	Retail Ground Beef HACCP Cecal (Beef) Cecal (Dairy)	1 107	2 64	0 82	2 43	6 63	3 95	2 104	4 59	1 61	1 99	1 84	0 4 89 21 56
	Swine	Retail Pork Chops HACCP <sup>2</sup> Cecal (Market Hogs) Cecal (Sows)	0 4	0 2	0	0 1	0	1 2	0 1	0 2	1 0	0	0	0 2 4
Resistance Pattern		Source Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%	0.0%
4. Resistant to ≥ 5 Antimicrobial Classes	<u> </u>	Retail Chickens	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	1 0.0%	0.0%	0.0%
	sues		3.3%	0.0%	0.0%	0 1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	1	0	0	1	0	0	0	0	0	0	0	0
		Cecal		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	ske	Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Turkeys	HACCP	0.0%	0.078	0.076	0.0%	0.0%	0.078	0.0 %	0.078	0.0%	0.076	0.0 %	
	<u> </u>	Cecal												
		Retail Ground Beef	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	HACCP	1.9% 2	0.0% 0	0.0% 0	0.0%	1.6% 1	0.0% 0	1.0% 1	1.7% 1	0.0% 0	4.0% 4	2.4% 2	2.2% 2
	Ö	Cecal (Beef)												4.8% 1
		Cecal (Dairy)												3.6% 2
		Retail Pork Chops						0.0%			0.0%			
	e e	HACCP	0.0%	0.0%		0.0% 0		0.0% 0	0.0%	0.0% 0				
	Swine	Cecal (Market Hogs)		-						-				0.0%
		Cecal (Sows)												0.0%
		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%	0.0%
5. At Least ACSSuT <sup>3</sup> Resistant	-	Retail Chickens	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0.0%	0.0%	0.0%
	Chickens	HACCP	3.3%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	į	Cecal	1	0	0	1	0	0	0	0	0	0	0	0
	<u> </u>	Retail Ground Turkey		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Þ	Cecal	0	0	0	0	0	0	0	0	0	0	0	
	_	Retail Ground Beef	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		HACCP	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	1.7%	0.0%	0 4.0%	2.4%	2.2%
	Cattle	Cecal (Beef)	1	0	0	0	0	0	1	1	0	4	2	4.8%
		Cecal (Dairy)												3.6%
	-	Retail Pork Chops						0.0%			0.0%			2
		HACCP	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%	0			
	Swine	Cecal (Market Hogs)	0	0		0		0	0	0				0.0%
		Cecal (Sows)												0.0%
		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6. At Least ACT/S <sup>4</sup> Resistant	<b> </b>	Retail Chickens	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0.0%	0.0%	0.0%
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Ē	Cecal	0	0	0	0	0	0	0	0	0	0	0	0
	H	Retail Ground Turkey		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	2	Cecal	0	0	0	0	0	0	0	0	0	0	0	
	H	Retail Ground Beef	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	<u>e</u>	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	Cecal (Beef)	0	0	0	0	0	0	0	0	0	0	0	0.0% 0
		Cecal (Dairy)												0.0%
	H	Retail Pork Chops						0.0%			0.0%			U
	ф	HACCP	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%	U			
	Swine	Cecal (Market Hogs)	U	U		U			U	U				0.0%
		Cecal (Sows)												0.0%
1 Starting in 2011, testing included in	nine ar		the addition	of the mac	rolide azithro	mycin, Beca	use resistan	ce to azithro	mycin is low	(in this case	e. <1%), anti	microbial		0

1 Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

2 In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

3 ACSSuT = ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline

4 ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole

Table 61c. Resistance Patterns among Salmonella Montevideo Isolates, 2002-2013

Table 61c. Resistance Patte	erns a	mong Salmonella						****		****				
Year Number of Isolates Tested	1	Humans	<b>2002</b> 61	2003 43	<b>2004</b> 50	<b>2005</b> 48	<b>2006</b> 62	<b>2007</b> 51	2008 68	<b>2009</b> 57	<b>2010</b> 58	<b>2011</b> 65	<b>2012</b> 60	<b>2013</b> 53
Number of isolates rested	Chickens	Retail Chickens HACCP Cecal	0 30	1 30	3 29	1 62	2 21	6 20	4	4	0 5	1	4 9	1 4 0
	Turkeys	Retail Ground Turkey HACCP Cecal	0 2	2	2 4	4 3	8	2 3	1 1	4 1	1 3	1 2	1 5	0 0
	Cattle	Retail Ground Beef HACCP Cecal (Beef) Cecal (Dairy)	1 107	2 64	0 82	2 43	6 63	3 95	2 104	4 59	1 61	1 99	1 84	4 89 21 56
Resistance Pattern	Swine	Retail Pork Chops HACCP <sup>1</sup> Cecal (Market Hogs) Cecal (Sows) Source	0 4	0 2	0	0	0	1 2	0 1	0 2	1 0	0	0	0 2 4
		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%	0.0%
7. At Least ACSSuTAuCx <sup>2</sup> Resistant	<u> </u>	1	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0.0%	0.0%	0.0%
	Chickens	Retail Chickens HACCP	3.3%	0.0%	0 0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0 0.0% 0
	Ď	Cecal				-	J	J	, and the second				Ü	Ü
	ē.	Retail Ground Turkey		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	-	Cecal												
		Retail Ground Beef	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	ag:	HACCP	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	0.0%	4.0%	2.4%	2.2%
	Cattle	Cecal (Beef)												4.8% 1
		Cecal (Dairy)												3.6%
		Retail Pork Chops						0.0%			0.0%			
	eu.	HACCP	0.0%	0.0% 0		0.0% 0		0.0%	0.0%	0.0%				
	Swine	Cecal (Market Hogs)												0.0% 0
		Cecal (Sows)												0.0% 0
8. At Least Ceftriaxone and		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nalidixic Acid Resistant	s	Retail Chickens		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	٥	Cecal	-			-			- V				Ü	
		Retail Ground Turkey		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
	F	Cecal	Ü			Ü			Ů				Ů	
		Retail Ground Beef	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	흗	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	Cecal (Beef)	Ü	J	J	Ü	Ů	Ů	Ů	Ü	Ü	Ü	Ů	0.0%
		Cecal (Dairy)												0.0%
		Retail Pork Chops						0.0%			0.0%			
	ne	HACCP	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%				
	Swine	Cecal (Market Hogs)							Ů	, and the second				0.0%
		Cecal (Sows)												0.0% 0

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low <sup>2</sup> ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

Table 62a. Antimicrobial Resistance among Salmonella Anatum Isolates, 2002-2013

Year				2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ied	S	Humans	22	18	16	12	10	18	14	13	19	16	16	20
		Chickens	Retail Chickens HACCP	0 4	0 2	0 4	1	1 6	0	2	0	1	1	1 0	0
		SPI	Cecal	4		4		0			'	'	'	U	0
		ske	Retail	0	1	0	1	0	1	7	1	0	0	2	2
		Turkeys	HACCP	0	0	1	1	9	1	1	2	6	0	3	2
		Ë	Cecal Retail	2	0	0	0	2	1	0	0	1	0	1	0
		Cattle	HACCP	94	61	68	22	26	23	34	7	14	18	1 18	16
		Ca	Cecal (Beef)												18
			Cecal (Dairy)	-							_				18
		ine	Retail HACCP1	0 21	0 10	0 32	2 19	0 61	0 13	0 5	0 10	1 5	0 8	0	0
		Swine	Cecal (Market Hogs)												33
	Antimicrobial		Cecal (Sows)												43
Autiminahial Olasa	(Resistance Breakpoint)		Isolate Source												
Antimicrobial Class Aminoglycosides	Gentamicin	+	Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.1%	0.0%	0.0%	0.0%	12.5%	0.0%
	(MIC ≥ 16 μg/mI)			0	0	0	0.0%	0.0%	0	0.0%	0	0.0%	0.0%	2 100.0%	0
		ens	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	0.0%	0.0%	1	
		Chickens	HACCP	0.078	0.078	0.078	0.078	0.078		0.078	1	0.078	0.078		
		O	Cecal												
			Retail Ground Turkey		0.0%		0.0%		100.0%	14.3% 1	0.0%			100.0% 2	0.0%
	1	Turkeys	HACCP			0.0%	0.0%	22.2%	0.0%	0.0%	0.0%	66.7%		0.0%	0.0%
	1	Ī	Cecal			0	0	2	0	0	0	4		0	0
	1	-		0.0%				0.0%	0.0%			0.0%		0.0%	0.0%
			Retail	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	HACCP	0.076	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0
		Ö	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail				0.0%					100.0% 1			
		Ф	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
		Swine	Cecal (Market Hogs)	0	0	0	0	0	0	0	0	0	0		0.0%
		0,													0.0%
			Cecal (Sows)	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	7.40/	0.00/	5.00/	0.00/	10.50/	0
	Kanamycin (MIC ≥ 64 μg/mI)		Humans	0.0%	0.0% 0	6.3% 1	0.0% 0	0.0% 0	0.0% 0	7.1% 1	0.0% 0	5.3% 1	0.0% 0	12.5% 2	0.0%
		S	Retail Chickens				0.0%	0.0%		0.0%		0.0%	0.0%	0.0%	
		Chickens	HACCP	0.0% 0	0.0%	0.0%	0.0%	0.0% 0		0.0%	0.0%	0.0% 0	0.0%		
		5	Cecal		J			J			- J				
		-	Retail Ground Turkey		0.0%		0.0%		0.0%	0.0%	0.0%			0.0%	0.0%
		eys			0	0.0%	0.0%	22.2%	0.0%	0.0%	0.0%	66.7%		0.0%	0.0%
		Turkeys	HACCP			0	0	2	0	0	0	4		0	0
			Cecal												
			Retail	0.0% 0				0.0% 0	0.0%			0.0% 0		0.0% 0	0.0%
		e e	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)		-	-	-	-		-		-	-		0.0%
			Cecal (Dairy)												0.0%
			Retail				0.0%					0.0%			0
	1			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
		Swine	HACCP	0.078	0.076	0.078	0.078	0.076	0.076	0.078	0.076	0.078	0.078		2.001
	1	Ø	Cecal (Market Hogs)												3.0% 1
			Cecal (Sows)												0.0%
	Streptomycin (MIC ≥ 64 µg/mI)		Humans	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	7.1% 1	0.0%	10.5% 2	6.3%	12.5% 2	0.0%
	(MIIO E 04 µg/IIII)		Retail Chickens	U	U		100.0%	0.0%	U	0.0%	U	0.0%	100.0%	100.0%	U
	1	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	0.0%	0.0%	1	
		Chic		0	0	0	0	0		0	1	0	0		
	1	-	Cecal		0.0%		0.0%		0.0%	14.3%	0.0%			100.0%	0.0%
	1	ks	Retail		0.0%		0		0	1	0			2	0
		Turkeys	HACCP			0.0%	0.0%	44.4% 4	0.0%	100.0% 1	0.0% 0	0.0%		0.0%	0.0%
	1	ľ	Cecal												
	1		Retail	0.0%				0.0%	0.0%			0.0%		0.0%	0.0%
		_	HACCP	2.1%	3.3%	1.5%	0.0%	7.7%	4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	1	Cattle		2	2	1	0	2	1	0	0	0	0	0	0.0%
	1		Cecal (Beef)												0.0%
	4	1	Cecal (Dairy)									465			0.0%
	1						0.0%					100.0%			
			Retail				0					1			
		ne	Retail HACCP	4.8%	10.0%	3.1%	0 10.5% 2	0.0%	0.0%	0.0%	0.0%	1 0.0%	0.0%		
		Swine					10.5%					1			0.0%

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 62b. Antimicrobial	Posistance among	Salmonolla	Anatum Isolatos	2002-2013

Table 62b. Antimicro	bial Resistance amo	ong .	Salmonella Anatur				2025	2000	2227	2000	2000	0010	0011	2012	2010
Year Number of Isolates Test	ad	1	Humans	<b>2002</b> 22	<b>2003</b> 18	<b>2004</b> 16	<b>2005</b> 12	<b>2006</b> 10	<b>2007</b> 18	<b>2008</b> 14	<b>2009</b> 13	<b>2010</b> 19	<b>2011</b> 16	<b>2012</b> 16	<b>2013</b> 20
Number of isolates Test	ea	SL	Retail Chickens	0	0	0	1	1	0	2	0	1	1	1	0
		Chickens	HACCP	4	2	4	1	6	0	1	1	1	1	0	0
		ပ်	Cecal												0
		eys	Retail	0	1	0	1	0	1	7	1	0	0	2	2
		Turkeys	HACCP	0	0	1	1	9	1	1	2	6	0	3	2
		Ë	Cecal	-				_							0
		qe qe	Retail HACCP	2 94	0 61	0 68	0 22	2 26	1 23	0 34	7	1 14	0 18	1 18	1 16
		Cattle	Cecal (Beef)	34	01	00		20	20	54	,	14	10	10	18
			Cecal (Dairy)												18
		0	Retail	0	0	0	2	0	0	0	0	1	0	0	0
		Swine	HACCP1 Cecal (Market Hogs)	21	10	32	19	61	13	5	10	5	8		33
		0)	Cecal (Narket Hogs)												43
	Antimicrobial		Isolate												
Antimicrobial Class	(Resistance Breakpoint)		Source												
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin- Clavulanic Acid		Humans	0.0%	0.0%	6.3% 1	0.0%	0.0%	0.0%	7.1% 1	0.0%	0.0%	0.0%	0.0%	0.0%
illibitor Combinations	(MIC ≥ 32 / 16 µg/ml)		Retail Chickens				100.0%	0.0%	-	0.0%	0	0.0%	0.0%	0.0%	
		suex		0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0	
		Chickens	HACCP	0.070	0.070	0.070	0	0.070		0	0	0.070	0		<u> </u>
		0	Cecal												
			Retail		0.0%		0.0%		0.0%	42.9% 3	0.0%			0.0%	0.0%
		Turkeys	HACCP		T T	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%		33.3%	0.0%
		Ţū				0	0	0	0	0	1	0		1	0
		-	Cecal	0.007				0.00/	0.00/			0.007		0.00/	0.00/
			Retail	0.0%				0.0% 0	0.0% 0			0.0% 0		0.0%	0.0%
		e	HACCP	1.1%	3.3%	1.5% 1	0.0%	3.8%	4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)								Ů	Ů			0.0%
															5.6%
			Cecal (Dairy)				0.0%					0.00/			1
			Retail				0					0.0% 0			
		Э	HACCP	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%	20.0%	0.0%		
		Swine	Cecal (Market Hogs)												0.0%
															0.0%
Combonia	Cefoxitin		Cecal (Sows)	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cephems	(MIC ≥ 32 µg/ml)		Humans	0.0%	0.0%	1	0	0	0.0%	0	0.0%	0	0	0	0.0%
		S	Retail Chickens				100.0%	0.0%		0.0%		0.0%	0.0%	0.0%	
		Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		
		S	Cecal	0	0	0	0	0		0	0	0	0		
					0.0%		0.0%		0.0%	42.9%	0.0%			0.0%	0.0%
		ys	Retail		0.070		0		0	3	0			0	0
		Turkeys	HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	50.0% 1	0.0%		33.3% 1	0.0%
		F	Cecal												
		-	Retail	0.0%				0.0%	0.0%			0.0%		0.0%	0.0%
				1.1%	3.3%	1.5%	0.0%	0 3.8%	0 4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	HACCP	1.170	2	1.570	0.070	1	1	0.070	0.070	0.070	0.070	0.070	0
		Ö	Cecal (Beef)												0.0%
			Cecal (Dairy)												5.6%
			Retail				0.0%					0.0%			
				0.0%	0.0%	0.0%	5.3%	0.0%	7.7%	0.0%	0.0%	0.0%	0.0%		
		Swine	HACCP	0.070	0.070	0.070	1	0.070	1	0.070	0.070	0.070	0.070		0.004
		Ø	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
	Ceftiofur	1	Humans	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	(MIC ≥ 8 μg/mI)	-	1	0	0	1	100.0%	0.0%	0	0.0%	0	0.0%	0.0%	0.0%	0
		sus	Retail Chickens	0.00/	0.00/	0.00/	1	0		0	0.00/	0	0	0	
		Chickens	HACCP	0.0%	0.0%	0.0% 0	0.0%	0.0% 0		0.0%	0.0%	0.0% 0	0.0% 0		
		Ö	Cecal												
			Retail		0.0%		0.0%		0.0%	42.9%	0.0%			0.0%	0.0%
		æys	HACCP		0	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%		33.3%	0.0%
		Turkeys				0	0	0	0	0	1	0		1	0
			Cecal												
		1	Retail	0.0%				0.0%	0.0%			0.0%		0.0%	0.0%
		Ф	HACCP	1.1%	3.3%	1.5%	0.0%	3.8%	4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle		1	2	1	0	1	1	0	0	0	0	0	0.0%
			Cecal (Beef)												0
		L	Cecal (Dairy)												5.6% 1
			Retail				0.0%					0.0%			
		0	HACCP	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%	20.0%	0.0%		
		Swine		0	1	0	0	0	0	1	0	1	0		0.0%
		"	Cecal (Market Hogs)												0
		1	Cecal (Sows)												0.0%

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Year	4-4		Humans	<b>2002</b> 22	<b>2003</b> 18	<b>2004</b> 16	<b>2005</b> 12	<b>2006</b> 10	<b>2007</b> 18	<b>2008</b> 14	<b>2009</b> 13	<b>2010</b> 19	<b>2011</b> 16	<b>2012</b> 16	<b>2013</b> 20
Number of Isolates Tes	ited	sus	Retail Chickens	0	0	0	12	10	0	2	0	19	16	16	0
		Chickens	HACCP	4	2	4	1	6	0	1	1	1	1	0	0
			Cecal Retail	0	1		1	0	1	7	1	0	0	2	0
		Turkeys	HACCP	0	0	0	1	9	1	7 1	1 2	0 6	0	3	2 2
		F	Cecal												0
		Cattle	Retail Ground Beef HACCP	2 94	0 61	0 68	0 22	2 26	1 23	0 34	0 7	1 14	0 18	1 18	1 16
		Ca	Cecal (Beef)												18
			Cecal (Dairy)  Retail Pork Chops	0	0	0	2	0	0	0	0	1	0	0	18 0
		Swine	HACCP <sup>1</sup>	21	10	32	19	61	13	5	10	5	8		
		Ó	Cecal (Market Hogs) Cecal (Sows)												33 43
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class	Breakpoint) Ceftriaxone		Source	0.09/	0.0%	6 20/	0.0%	0.0%	0.0%	0.00/	0.0%	0.0%	0.0%	0.0%	0.0%
Cephems	(MIC ≥ 4 µg/mI)		Humans	0.0%	0.0%	6.3% 1	0	0	0.0%	0.0%	0.0%	0	0	0	0.0%
		SL	Retail Chickens				100.0% 1	0.0% 0		0.0% 0		0.0% 0	0.0% 0	0.0%	
		Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		
		O	Cecal												
			Retail		0.0% 0		0.0%		0.0%	42.9% 3	0.0%			0.0%	0.0%
		Turkeys	HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%		33.3%	0.0%
		Ţ	Cecal			0	0	0	0	0	1	0		1	0
		-	Retail	0.0%				0.0%	0.0%			0.0%		0.0%	0.0%
				0 1.1%	3.3%	1.5%	0.0%	0 3.8%	0 8.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	HACCP	1	2	1	0	1	2	0	0	0	0	0	0.0%
			Cecal (Beef)												0.0 % 0 5.6%
			Cecal (Dairy)												1
			Retail				0.0% 0					0.0% 0			
		Swine	HACCP	0.0%	10.0% 1	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%	20.0%	0.0%		
		Š	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
Folate Pathway Inhibito	Sulfamethoxazole/ Sulfisoxazole <sup>2</sup>		Humans	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	7.1%	0.0%	5.3%	0.0%	12.5%	0.0%
	(MIC ≥ 512 µg/ml)		Retail Chickens	0	0	1	0.0%	0.0%	0	0.0%	0	0.0%	0.0%	0.0%	0
		Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	0.0%	0.0%	0	
		Chic	Cecal	0	0	0	0	0		0	1	0	0		
					0.0%		0.0%		100.0%	14.3%	0.0%			0.0%	0.0%
		ske	Retail		0	0.0%	0.0%	33.3%	1 0.0%	1 100.0%	0.0%	50.0%		0.0%	0.0%
		Turkeys	HACCP			0.070	0.070	3	0.076	1	0.070	3		0.070	0.070
			Cecal												
			Retail	0.0%				0.0% 0	0.0% 0			0.0% 0		0.0%	0.0%
		Cattle	HACCP	2.1%	3.3%	1.5% 1	0.0%	3.8% 1	4.3% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Š	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail				0.0%					100.0%			, ,
		m	HACCP	4.8%	0.0%	6.3%	0.0%	1.6%	7.7%	0.0%	0.0%	0.0%	0.0%		
		Swine	Cecal (Market Hogs)	1	0	2	0	1	1	0	0	0	0		6.1%
															0.0%
	Trimethoprim-	+-	Cecal (Sows)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Sulfamethoxazole	<u> </u>	Humans	0.078	0.078	0.078	0.0%	0.0%	0.078	0.0%	0.078	0.0%	0	0.0%	0.078
	(MIC ≥ 4 / 76 μg/ml)	SUC	Retail Chickens				0	0		0		0	0.0%	0.0%	
		Chickens	HACCP	0.0%	0.0% 0	0.0%	0.0% 0	0.0%		0.0% 0	0.0%	0.0%	0.0% 0		
			Cecal												
		"	Retail		0.0%		0.0%		0.0% 0	0.0% 0	0.0%			0.0% 0	0.0%
		Turkeys	HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
		12	Cecal			Ť									
		$\vdash$	Retail	0.0%				0.0%	0.0%			0.0%		0.0%	0.0%
			HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle		0	0	0	0	0	0	0	0	0	0	0	0.0%
			Cecal (Beef)												0.0%
		_	Cecal (Dairy)				0.09/					0.09/			0.0%
			Retail	0.007	0.007	0.007	0.0%	0.007	0.007	0.007	0.00/	0.0%	0.007		
		Swine	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
		Š	Cecal (Market Hogs)												0.0%
															0.0%

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low <sup>2</sup> Sulfamethoxazole was tested from 1996-2003 and was replaced by sulfisoxazole in 2004

Year	obial Resistance am			2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	ted	(0	Humans	22	18	16	12	10	18	14	13	19	16	16	20
		Chickens	Retail Chickens HACCP	0 4	0 2	0 4	1	1 6	0	2	0	1	1	1 0	0
		Chic	Cecal	7		-	'		0	'		'			0
		Turkeys	Retail	0	1	0	1	0	1	7	1	0	0	2	2
		Turk	HACCP Cecal	94	61	68	22	26	23	34	7	14	18	18	16 18
			Retail Ground Beef	2	0	0	0	2	1	0	0	1	0	1	1
		Cattle	HACCP	94	61	68	22	26	23	34	7	14	18	18	16 18
			Cecal (Beef) Cecal (Dairy)												18
		0	Retail Pork Chops	0	0	0	2	0	0	0	0	1	0	0	0
		Swine	HACCP <sup>1</sup> Cecal (Market Hogs)	21	10	32	19	61	13	5	10	5	8		33
		0,	Cecal (Sows)												43
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class Macrolides	Breakpoint) Azithromycin		Source										0.0%	0.0%	0.0%
maci onacs	(MIC ≥32 μg/mI)		Humans										0.0%	0.0%	0
		ens	Retail Chickens										0.0%	0.070	
		Chickens	HACCP										0.076		
			Cecal											0.0%	0.0%
		sys	Retail											0	0
		Turkeys	HACCP											0.0%	0.0%
		Ĺ	Cecal											0.0%	0.00/
			Retail											0	0.0%
		Cattle	HACCP										0.0% 0	0.0% 0	0.0%
		Cs	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0% 0
			Retail												
		Swine	HACCP										0.0%		
		Sw	Cecal (Market Hogs)												0.0% 0
			Cecal (Sows)												0.0% 0
Penicillins	Ampicillin (MIC ≥ 32 μg/ml)		Humans	0.0%	0.0% 0	6.3% 1	0.0% 0	0.0% 0	0.0%	14.3% 2	0.0%	5.3% 1	0.0%	0.0%	0.0%
	(IIIIO = 02 pg/IIII)		Retail Chickens				100.0%	0.0%		0.0%		0.0%	0.0%	0.0%	
		Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	U	
		Chi	Cecal	0	0	0	0	0		0	0	0	0		
			Retail		0.0%		0.0%		100.0%	42.9%	0.0%			100.0%	0.0%
		Turkeys	HACCP		0	0.0%	0.0%	33.3%	0.0%	3 100.0%	50.0%	33.3%		33.3%	0.0%
		Tur				0	0	3	0	1	1	2		1	0
			Cecal	0.0%				0.0%	0.0%			0.0%		0.0%	0.0%
			Retail	0	3.3%	1.5%	0.0%	3.8%	0 4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	HACCP	1	2	1.570	0.070	1	1	0.070	0.070	0.070	0.076	0.076	0.0%
		C	Cecal (Beef)												0
			Cecal (Dairy)												5.6% 1
			Retail				0.0%					100.0% 1			
		Swine	HACCP	0.0%	20.0%	0.0%	0.0%	0.0% 0	0.0% 0	20.0%	0.0%	20.0%	0.0% 0		
		Sw	Cecal (Market Hogs)												3.0% 1
			Cecal (Sows)												0.0%
Phenicols	Chloramphenicol (MIC ≥ 32 µg/mI)		Humans	0.0%	0.0%	6.3% 1	0.0%	0.0%	0.0%	14.3% 2	0.0%	0.0%	0.0%	0.0%	0.0%
	,ο = ο2 μg/III)	(0	Retail Chickens		Ľ		0.0%	0.0%		0.0%		0.0%	0.0%	0.0%	
		Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	U	
		Chi	Cecal	0	0	0	0	0		0	0	0	0		
			Retail		0.0%		0.0%		0.0%	0.0%	0.0%			0.0%	0.0%
		Turkeys	HACCP		0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
		Turk				0	0	0	0	0	0	0		0	0
		$\vdash$	Cecal	0.0%				0.0%	0.0%			0.0%		0.0%	0.0%
			Retail	0.0%	3.3%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	HACCP	0.0%	2	1.5%	0.0%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0
		ď	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail				0.0%					0.0% 0			
		ne	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
		Swine	Cecal (Market Hogs)	Ť	Ť	Ť	Ť	Ť	Ť	Ť	Ť	Ť	Ť		0.0%
			Cecal (Sows)												0.0%
		· C-/	monella because in prio	r voore tho	noreant of	pork cares	no comple	o positivo f	C-/	//- ···	-1-441-1				0

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 62e. Antimicrobial Resistance among Salmonella Anatum Isolates, 2002-2013

Table 62e. Antimicro	biai resistance am	ong .	Samonena Anatur	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ted		Humans	22	18	16	12	10	18	14	13	19	16	16	20
		Chickens	Retail Chickens	0	0	0	1	1	0	2	0	1	1	1	0
		Chic	HACCP Cecal	4	2	4	1	6	0	1	1	1	1	0	0
			Retail	0	1	0	1	0	1	7	1	0	0	2	2
		Turkeys	HACCP	0	0	1	1	9	1	1	2	6	0	3	2
		-	Cecal				_					,		,	0
		ale	Retail Ground Beef HACCP	2 94	0 61	0 68	0 22	2 26	1 23	0 34	0 7	1 14	0 18	1 18	1 16
		Cattle	Cecal (Beef)												18
			Cecal (Dairy)												18
		ne	Retail Pork Chops HACCP <sup>1</sup>	0 21	0 10	0 32	2 19	0 61	0 13	0 5	0 10	1 5	0 8	0	0
		Swine	Cecal (Market Hogs)												33
	Antimicrobial		Cecal (Sows)												43
Austinianshial Olana	(Resistance Breakpoint)		Isolate Source												
Antimicrobial Class Quinolones	Ciprofloxacin	1	Humans	0.0%	5.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	(MIC ≥ 1 µg/mI)	-	Retail Chickens	0	1	0	0.0%	0.0%	0	0.0%	0	0.0%	0.0%	0.0%	0
		sue		0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0	
		Chickens	HACCP	0.070	0.070	0	0.070	0.070		0.070	0.070	0.070	0.070		
			Cecal												
		S.	Retail		0.0% 0		0.0%		0.0% 0	0.0%	0.0%			0.0%	0.0%
		Turkeys	HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
		F	Cecal												
			Retail	0.0%				0.0%	0.0%			0.0%		0.0%	0.0%
		_	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)	0	0	0	0	0	0	0	0	0	0	0	0.0%
		ľ													0.0%
			Cecal (Dairy)				0.0%					0.0%			0
			Retail				0					0			
		Swine	HACCP	0.0% 0	0.0% 0	0.0%	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0		
		Sw	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
	Nalidixic Acid		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.1%	0.0%	0.0%	0.0%	0.0%	5.0%
	(MIC ≥ 32 μg/ml)	-	Retail Chickens	0	0	0	0.0%	0.0%	0	0.0%	0	0.0%	0.0%	0.0%	1
		sue	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0	
		Chickens		0	0	0	0	0		0	0	0	0		
			Cecal		0.0%		0.0%		0.0%	0.0%	0.0%			0.0%	0.0%
		ys	Retail		0.078	0.00/	0	0.00/	0	0	0	0.00/		0	0
		Turkeys	HACCP			0.0%	0.0%	0.0% 0	0.0% 0	0.0%	0.0%	0.0%		0.0%	0.0%
		-	Cecal												
			Retail	0.0% 0				0.0% 0	0.0% 0			0.0%		0.0%	0.0% 0
		0	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)	0	0	0	0	0	0	0	0	0	0	0	0.0%
			Cecal (Dairy)												0.0%
							0.0%					0.0%			0
			Retail	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
		Swine	HACCP	0.076	0.078	0.078	0.078	0.076	0.078	0.076	0.078	0.078	0.078		3.0%
		Ś	Cecal (Market Hogs)												1
			Cecal (Sows)												0.0%
Tetracyclines	Tetracycline (MIC ≥ 16 μg/mI)		Humans	0.0%	5.6% 1	12.5% 2	0.0%	10.0% 1	16.7% 3	21.4% 3	7.7% 1	0.0%	12.5% 2	18.8% 3	0.0%
		10	Retail Chickens				100.0%	100.0%		0.0%		0.0%	0.0%	100.0%	
		Chickens	HACCP	0.0%	0.0%	50.0%	0.0%	33.3%		0.0%	100.0%	0.0%	0.0%		
		Chic	Cecal	0	0	2	0	2		0	1	0	0		
		-	Retail		0.0%		100.0%		0.0%	42.9%	0.0%			100.0%	100.0%
		ske			0	100.0%	1 100.0%	55.6%	0 100.0%	3 100.0%	0.0%	33.3%		2 33.3%	2 50.0%
		Turkeys	HACCP			1	1	5	1	1	0.078	2		1	1
		Ĺ	Cecal												
			Retail	0.0%				50.0% 1	0.0% 0			0.0% 0		0.0%	0.0%
		<del>‡</del>	HACCP	21.3% 20	29.5% 18	29.4% 20	31.8% 7	26.9% 7	26.1% 6	14.7% 5	28.6% 2	7.1% 1	11.1% 2	0.0%	12.5% 2
		Cattle	Cecal (Beef)		, J				Ť	Ť					5.6%
			Cecal (Dairy)												11.1%
		$\vdash$	Retail				50.0%					0.0%			2
				81.0%	50.0%	93.8%	1 89.5%	91.8%	69.2%	60.0%	50.0%	0 60.0%	50.0%		
		Swine	HACCP	17	5	30	17	56	9	3	5	3	4		26 40/
	1	Ó	Cecal (Market Hogs)												36.4% 12
															39.5%

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 63a. Resistance Patterns among Salmonella Anatum Isolates, 2002-2013<sup>1</sup>

Table 63a. Resistance Patt	CIIIS	among Saimoneii					2000	1 0007	0000	0000	0040	0044	0040	2012
Year Number of Isolates Tested		Humans	<b>2002</b> 22	<b>2003</b> 18	<b>2004</b> 16	<b>2005</b> 12	<b>2006</b> 10	<b>2007</b> 18	<b>2008</b> 14	<b>2009</b> 13	<b>2010</b> 19	<b>2011</b> 16	<b>2012</b> 16	<b>2013</b> 20
	SU	Retail Chickens	0	0	0	1	1	0	2	0	1	1	1	0
	Chickens	HACCP	4	2	4	1	6	0	1	1	1	1	0	0
		Cecal							_					0
	Turkeys	Retail Ground Turkey HACCP	0	1	0	1	9	1 1	7	1 2	0 6	0	2	2 2
	Ţ	Cecal						·	·				_	0
		Retail Ground Beef	2	0	0	0	2	1	0	0	1	0	1	1
	Cattle	HACCP Cecal (Beef)	94	61	68	22	26	23	34	7	14	18	18	16 18
	Ĺ	Cecal (Dairy)												18
		Retail Pork Chops	0	0	0	2	0	0	0	0	1	0	0	0
	Swine	HACCP <sup>2</sup> Cecal (Market Hogs)	21	10	32	19	61	13	5	10	5	8		33
		Cecal (Sows)												43
Resistance Pattern	╁	Source	100.0%	94.4%	87.5%	100.0%	90.0%	83.3%	78.6%	92.3%	84.2%	81.3%	81.3%	95.0%
1. No Resistance Detected	<u> </u>	Humans	22	17	14	12 0.0%	9	15	11 100.0%	12	16 100.0%	13 0.0%	13 0.0%	19
	SI	Retail Chickens				0	0		2		1	0	0.078	
	Chickens	HACCP	75.0% 3	100.0% 2	50.0% 2	100.0% 1	66.7% 4		100.0% 1	0.0%	100.0% 1	100.0% 1		
	O	Cecal												
	-	Retail Ground Turkey		100.0%		0.0%		0.0%	42.9%	100.0%			0.0%	0.0%
	eys			1	0.0%	0.0%	22.2%	0.0%	3 0.0%	3 50.0%	16.7%		0 33.3%	0 50.0%
	Turkeys	HACCP			0	0	2	0	0	1	1		1	1
	Ĺ	Cecal												
		Retail Ground Beef	100.0% 2				50.0% 1	100.0% 1			100.0%		100.0%	100.0%
	m	HACCP	76.6%	70.5%	70.6%	68.2%	69.2%	73.9%	85.3%	71.4%	92.9%	88.9%	100.0%	87.5%
	Cattle		72	43	48	15	18	17	29	5	13	16	18	14 94.4%
		Cecal (Beef)												17
	L	Cecal (Dairy)												83.3% 15
		Retail Pork Chops				50.0% 1					0.0%			
		HACCP	14.3%	30.0%	6.3%	10.5%	6.6%	30.8%	20.0%	50.0%	20.0%	50.0%		
	Swine		3	3	2	2	4	4	1	5	1	4		63.6%
		Cecal (Market Hogs)												21 60.5%
		Cecal (Sows)												26
2. Resistant to ≥ 3		Humans	0.0%	0.0%	6.3% 1	0.0%	0.0%	0.0%	14.3% 2	0.0%	5.3%	0.0%	12.5% 2	0.0%
Antimicrobial Classes		Retail Chickens				100.0%	0.0%		0.0%		0.0%	0.0%	100.0%	
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	0.0%	0.0%	1	
	Chic		0	0	0	0	0		0	1	0	0		
	<u> </u>	Cecal							10.001					
	ys.	Retail Ground Turkey		0.0% 0		0.0% 0		100.0% 1	42.9% 3	0.0%			100.0% 2	0.0% 0
	Turkeys	HACCP			0.0%	0.0%	33.3% 3	0.0%	100.0%	50.0% 1	33.3% 2		33.3% 1	0.0%
	F	Cecal												
	┝	Retail Ground Beef	0.0%				0.0%	0.0%			0.0%		0.0%	0.0%
			0 1.1%	3.3%	1.5%	0.0%	0 3.8%	0 4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	HACCP	1	2	1	0	1	1	0	0	0	0	0	0
	O	Cecal (Beef)												0.0%
		Cecal (Dairy)												5.6%
	$\vdash$	Retail Pork Chops				0.0%					100.0%			1
			0.0%	10.0%	3.1%	0.0%	0.0%	0.0%	20.0%	0.0%	20.0%	0.0%		
	Swine	HACCP	0	1	1	0	0	0	1	0	1	0		2.001
	S	Cecal (Market Hogs)												3.0% 1
		Cecal (Sows)												0.0%
2 Decistant to 2 4	Ī	Humans	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	14.3%	0.0%	0.0%	0.0%	0.0%	0.0%
3. Resistant to ≥ 4 Antimicrobial Classes	H	Retail Chickens	0	0	1	100.0%	0.0%	0	0.0%	0	0.0%	0.0%	0.0%	0
	ens		0.0%	0.0%	0.0%	1 0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0	
	Chickens	HACCP	0	0	0	0	0		0	0	0	0		
	Ĺ	Cecal												
		Retail Ground Turkey		0.0%		0.0%		0.0% 0	42.9% 3	0.0%			0.0%	0.0%
	Turkeys	HACCP			0.0%	0.0%	11.1%	0.0%	100.0%	0.0%	0.0%		0.0%	0.0%
	12	Cecal			0	0	1	0	1	0	0		0	0
	$\vdash$		0.0%				0.0%	0.0%			0.0%		0.0%	0.0%
		Retail Ground Beef	0.0%	3.3%	1.5%	0.0%	3.8%	0 4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	HACCP	0.0%	2	1.5%	0.0%	1	4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0
	ď	Cecal (Beef)												0.0% 0
		Cecal (Dairy)												0.0%
	T	Retail Pork Chops				0.0%					0.0%			Ü
		HACCP	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
	Swine		0	1	0	0	0	0	0	0	0	0		2.00/
	S	Cecal (Market Hogs)												3.0% 1
		Cecal (Sows)												0.0%
1 Starting in 2011, testing included	nino c	ntimiarabial alagaga wi	th the edditio							C 41.	40()			

<sup>&</sup>lt;sup>1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

<sup>2</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

Table 63b, Resistance Patterns among Salmonella Anatum Isolates, 2002-2013<sup>1</sup>

Table 63b. Resistance Patte	erns	among Salmoneli					0000	0007	2000	2222	0040	0044	2042	2042
Year Number of Isolates Tested		Humans	<b>2002</b> 22	<b>2003</b> 18	<b>2004</b> 16	<b>2005</b> 12	<b>2006</b> 10	<b>2007</b> 18	<b>2008</b> 14	<b>2009</b> 13	<b>2010</b> 19	<b>2011</b> 16	<b>2012</b> 16	<b>2013</b> 20
	Chickens	Retail Chickens HACCP Cecal	0 4	0 2	0 4	1	1 6	0	2	0 1	1	1	1 0	0 0 0
	Turkeys	Retail Ground Turkey HACCP Cecal	0	1 0	0	1	0 9	1	7	1 2	0 6	0	2	2 2 0
	Cattle	Retail Ground Beef HACCP Cecal (Beef) Cecal (Dairy)	2 94	0 61	0 68	0 22	2 26	1 23	0 34	0 7	1 14	0 18	1 18	1 16 18 18
	Swine	Retail Pork Chops HACCP <sup>2</sup> Cecal (Market Hogs) Cecal (Sows)	0 21	0 10	0 32	2 19	0 61	0 13	0 5	0 10	1 5	0 8	0	0 33 43
Resistance Pattern		Source Humans	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%
4. Resistant to ≥ 5 Antimicrobial Classes	_	ı	0	0	1	0 100.0%	0.0%	0	0.0%	0	0.0%	0.0%	0.0%	0
	ens	Retail Chickens	0.0%	0.0%	0.0%	1 0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0	
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		
		Cecal												
		Retail Ground Turkey		0.0%		0.0%		0.0%	0.0%	0.0%			0.0%	0.0%
	Turkeys	HACCP			0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0% 0		0.0% 0	0.0%
	F	Cecal			0	0	U			,			,	0
	H	Retail Ground Beef	0.0%				0.0%	0.0%			0.0%		0.0%	0.0%
	_	HACCP	0.0%	3.3%	1.5%	0.0%	3.8%	0 4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	Cecal (Beef)	0	2	1	0	1	1	0	0	0	0	0	0.0%
														0.0%
		Cecal (Dairy)				0.0%					0.0%			0
		Retail Pork Chops				0					0			
	Swine	HACCP	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%		
	š	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0.0%
		Humans	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%
5. At Least ACSSuT <sup>3</sup> Resistant	_	Retail Chickens	0	0	1	0.0%	0.0%	0	0.0%	0	0.0%	0.0%	0.0%	0
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0	
	Chic		0	0	0	0	0		0	0	0	0		
		Cecal		0.0%		0.0%		0.0%	0.0%	0.0%			0.0%	0.0%
	sk	Retail Ground Turkey		0.0%		0		0	0	0			0	0
	Turkeys	HACCP			0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0%	0.0% 0		0.0% 0	0.0%
		Cecal												
		Retail Ground Beef	0.0%				0.0%	0.0% 0			0.0%		0.0%	0.0%
	Cattle	HACCP	0.0%	3.3%	1.5% 1	0.0%	3.8% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	రొ	Cecal (Beef)												0.0%
		Cecal (Dairy)												0.0%
		Retail Pork Chops				0.0%					0.0%			
	e e	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
	Swine	Cecal (Market Hogs)		0	U		0			0	Ü	0		0.0%
		Cecal (Sows)												0.0%
,		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6. At Least ACT/S <sup>4</sup> Resistant	_	Retail Chickens	0	0	0	0.0%	0.0%	0	0.0%	0	0.0%	0.0%	0.0%	0
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0	
	Chic	Cecal	0	0	0	0	0		0	0	0	0		
	_	Retail Ground Turkey		0.0%		0.0%		0.0%	0.0%	0.0%			0.0%	0.0%
	Turkeys	HACCP		0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
	Ę				0	0	0	0	0	0	0		0	0
	$\vdash$	Cecal	0.0%				0.0%	0.0%			0.0%		0.0%	0.0%
		Retail Ground Beef	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	HACCP	0	0	0	0	0	0	0	0	0	0	0	0.0%
	آ	Cecal (Beef)												0.0%
	<u> </u>	Cecal (Dairy)				0.0%					0.00/			0.0%
		Retail Pork Chops	0.77	0.77	0.77	0	0.000	0.77	0.000	0.000	0.0%	0.77		
	Swine	HACCP	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0% 0	0.0% 0		
	s,	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0.0%
Starting in 2011, testing included	nine a	antimicrobial classes wi	th the addition	on of the ma	crolide azith	romycin. Bed	ause resista	ance to azith	romycin is lo	w (in this cas	se, <1%), an	timicrobial c	ass resistan	

<sup>&</sup>lt;sup>1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

<sup>2</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

 $<sup>^3</sup>$  ACSSuT = ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline  $^4$  ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole

Table 63c. Resistance Patterns among Salmonella Anatum Isolates, 2002-2013

Year			2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	22	18	16	12	10	18	14	13	19	16	16	20
	Chickens	Retail Chickens HACCP Cecal	0 4	0 2	0 4	1	1 6	0	1	0	1	1	0	0 0 0
	Turkeys	Retail Ground Turkey HACCP Cecal	0	0	0	1	9	1	7	1 2	0 6	0	2	2 2 0
	Cattle	Retail Ground Beef HACCP Cecal (Beef) Cecal (Dairy)	2 94	0 61	0 68	0 22	2 26	1 23	0 34	7	1 14	0 18	1 18	1 16 18 18
Resistance Pattern	Swine	Retail Pork Chops HACCP <sup>1</sup> Cecal (Market Hogs) Cecal (Sows) Source	0 21	0 10	0 32	2 19	0 61	0 13	0 5	0 10	1 5	0 8	0	0 33 43
		Humans	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7. At Least ACSSuTAuCx <sup>2</sup> Resistant	_	Retail Chickens	0	0	1	0 0.0% 0	0.0% 0	0	0 0.0% 0	0	0 0.0% 0	0 0.0% 0	0 0.0% 0	0
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		
	0	Cecal												
	· s	Retail Ground Turkey		0.0%		0.0%		0.0%	0.0%	0.0%			0.0%	0.0%
	Turkeys	HACCP			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%
	F	Cecal						-	Ü	Ü				
		Retail Ground Beef	0.0%				0.0%	0.0%			0.0%		0.0%	0.0%
	Cattle	HACCP	0.0%	3.3% 2	1.5% 1	0.0%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	ర	Cecal (Beef)												0.0%
		Cecal (Dairy)												0.0%
		Retail Pork Chops				0.0%					0.0%			
	eu.	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
	Swine	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0.0%
8. At Least Ceftriaxone and		Humans	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0%
Nalidixic Acid Resistant	2	Retail Chickens				0.0%	0.0%		0.0%		0.0%	0.0%	0.0%	
	Chickens	HACCP	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0		0.0% 0	0.0%	0.0%	0.0% 0		
	٥	Cecal										-		
	"	Retail Ground Turkey		0.0%		0.0%		0.0%	0.0%	0.0%			0.0%	0.0%
	Turkeys	HACCP			0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0		0.0% 0	0.0% 0
	ľ	Cecal												
		Retail Ground Beef	0.0% 0				0.0% 0	0.0% 0			0.0% 0		0.0% 0	0.0% 0
	Cattle	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	ပိ	Cecal (Beef)												0.0%
		Cecal (Dairy)												0.0%
		Retail Pork Chops				0.0%					0.0%			
	ine	HACCP	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0		
	Swine	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0.0%

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low <sup>2</sup> ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

Table 64a. Antimicrobial Resistance among Salmonella Johannesburg Isolates, 2002-2013

/ear			Humana	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Te	sted	SL	Humans	1	2	2	3	0	7	3	5	2	1	5	1
		Chickens	Retail HACCP	0 4	0 3	0	0	1 2	0	0 0	0	0 8	0 6	0	0
			Cecal												0
		Turkeys	Retail HACCP	0	0	0	1	0 2	0	0	0	0	0	0 2	0
		ī	Cecal				·	-	·	ŭ	·			_	0
		Ф	Retail	0	0	0	0	1	0	0	0	0	0	0	0
		Cattle	HACCP Cecal (Beef)	1	0	2	0	1	0	0	0	1	0	2	2
			Cecal (Dairy)												0
		g e	Retail	0	2	0	0	0	0	2	0	0	0	0	3
		Swine	HACCP1 Cecal (Market Hogs)	15	10	11	15	29	22	5	11	8	12		21
	Antimicrobial		Cecal (Sows)												33
	(Resistance		Isolate												
Antimicrobial Class Aminoglycosides	Breakpoint) Gentamicin		Source Humans	0.0%	0.0%	0.0%	0.0%		14.3%	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%
	(MIC ≥ 16 μg/mI)	-		0	0	0	0	0.0%	1	0	0	0	0	1	0
		ens	Retail	0.0%	66.7%		100.0%	0 50.0%	100.0%			62.5%	66.7%	0.0%	
		Chickens	HACCP	0.070	2		3	1	1			5	4	0.070	
		Ľ	Cecal												
		s	Retail				0.0%								
		Turkeys	HACCP				0.0% 0	50.0% 1	0.0% 0		100.0% 1			100.0% 2	
		ř	Cecal											_	
			Retail					0.0%							
			HACCP	0.0%		0.0%		0.0%				0.0%		0.0%	50.0%
		Cattle		0		0		0				0		0	1
		ľ	Cecal (Beef)												
			Cecal (Dairy)		0.00/					0.00/					0.00/
			Retail		0.0%					0.0% 0					0.0%
		ne	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
		Swine	Cecal (Market Hogs)												0.0% 0
			Cecal (Sows)												0.0%
	Kanamycin	-	Humans	0.0%	0.0%	0.0%	0.0%		14.3%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
	(MIC ≥ 64 μg/mI)		Retail	0	0	0	0	0.0%	1	0	0	0	1	0	0
		sue		0.0%	33.3%		100.0%	0 50.0%	0.0%			12.5%	16.7%	0.0%	
		Chickens	HACCP	0	1		3	1	0			1	1	0	
		Ľ	Cecal												
		ş	Retail				0.0%								
		Turkeys	HACCP				0.0%	0.0%	0.0%		0.0%			0.0%	
		F	Cecal												
			Retail					0.0%							
			HACCP	0.0%		0.0%		0.0%				100.0%		0.0%	0.0%
		Cattle	Cecal (Beef)	0		0		0				1		0	0
		-	Cecal (Dairy)		0.0%					0.0%					0.0%
			Retail		0					0					0.0%
		Swine	HACCP	0.0%	0.0% 0	0.0% 0	0.0%	3.4% 1	9.1% 2	0.0% 0	0.0%	0.0%	0.0%		
		Š	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
	Streptomycin		Humans	0.0%	0.0%	0.0%	0.0%		14.3%	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%
	(MIC ≥ 64 μg/mI)	<u> </u>	Retail	0	0	0	0	0.0%	1	0	0	0	0	1	0
		kens	HACCP	0.0%	66.7%		100.0%	50.0%	100.0%			62.5%	66.7%	0.0%	
		Chickens		0	2		3	1	1			5	4	0	
		<u> </u>	Cecal				0.0%								
		sk	Retail				0	0.001	0.001		0.001			E0.00/	
		Turkeys	HACCP				100.0% 1	0.0%	0.0% 0		0.0%			50.0% 1	
		Ľ	Cecal												
			Retail					0.0%							
		0	HACCP	0.0%		0.0%		0.0%				100.0%		0.0%	100.09
		Cattle	Cecal (Beef)	0		0		0				1		0	2
		-	Cecal (Dairy)		0.0%					0.0%					0.0%
			Retail	0.771	0	0.771	0.551	0.55	0.77	0	0.551	0	0.771		0.0%
		Swine	HACCP	0.0% 0	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0% 0		
		Š	Cecal (Market Hogs)												0.0%
		δ <u>σ</u>													0.0%

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 64b. Antimicrobial Resistance among Salmonella Johannesburg Isolates, 2002-2013 2002 2010 2011 2012 Year 2007 Humans Number of Isolates Tested 0 0 0 0 0 0 0 0 HACCP Chick Cecal 0 Turkeys Retail 0 0 0 0 0 0 0 0 0 0 0 HACCP 0 1 0 0 0 0 0 0 Cecal Retail 0 0 0 0 0 0 0 0 0 0 0 HACCP 0 2 0 0 0 0 0 Cecal (Beef) 0 Cecal (Dairy) 0 3 HACCP1 15 10 11 15 29 22 11 8 12 Cecal (Market Hogs) 21 Cecal (Sows) 33 (Resistance Antimicrobial Class β-Lactam/β-Lactamase Breakpoint) Source 0.0% 0.0% Humans Clavulanic Acid 0 0 0 0 0 Inhibitor Combination 0 (MIC ≥ 32 / 16 µg/ml) 0.0% Retail 0.0% HACCP 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Cecal 0.0% Retail HACCP Cecal 0.0% Retail 0.0% 100.0% HACCE 0.0% 0.0% 0.0% 0.0% Cecal (Beef) Cecal (Dairy) 0.0% 0.0% 0.0% Retail 0.0% 0.0% 6.9% 0.0% 9.1% 0.0% HACCP Cecal (Market Hogs) 4.8% 0.0% 0 Cecal (Sows) Cephems Cefoxitin (MIC ≥ 32 µg/mI) 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Humans

0

0.0%

0.0%

0.0%

0.0%

0.0%

0

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

Retail Chickens

HACCP Cecal

Retail HACCP

Cecal

Retail

HACCE Cecal (Beef) Cecal (Dairy)

Retail HACCP Swine

Ceftiofur (MIC ≥ 8 µg/mI)

Cecal (Market Hogs)

Cecal (Sows)

Humans Retail Chickens

HACCP Cecal

Retail

HACCP

Cecal

Retail

HACCE Cecal (Beef) Cecal (Dairy)

Retail

HACCP

Cecal (Market Hogs)

0

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

6.9%

0.0%

0.0%

0.0%

100.0%

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4.8% 0.0%

0.0%

0.0%

0

4.8%

1 In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

0.0%

Antimicrobial Class Cephems	vd	Cattle Turkeys Chickens	Humans  Retail  HACCP  Cecal  Retail  HACCP  Cecal	1 0 4 0	2 0 3	2 0 0	3 0 3	0 1 2	7 0 1	3 0 0	5 0 0	2 0 8	1 0 6	5 0 1	0
Antimicrobial Class Cephems		Turkeys	HACCP Cecal Retail HACCP	4											
Antimicrobial Class Cephems		Turkeys	Cecal Retail HACCP												0
Antimicrobial Class Cephems			HACCP	0								_		·	0
Antimicrobial Class Cephems					0	0	1	0	0	0	0	0	0	0	0
Antimicrobial Class Cephems		Cattle		0	0	0	1	2	1	0	1	0	0	2	0
Antimicrobial Class Cephems		Cattle	Retail Ground Beef	0	0	0	0	1	0	0	0	0	0	0	0
Antimicrobial Class Cephems		0	HACCP	1	0	2	0	1	0	0	0	1	0	2	2
Antimicrobial Class Cephems			Cecal (Beef) Cecal (Dairy)												0
Antimicrobial Class Cephems			Retail Pork Chops	0	2	0	0	0	0	2	0	0	0	0	3
Antimicrobial Class Cephems		Swine	HACCP <sup>1</sup>	15	10	11	15	29	22	5	11	8	12		04
Antimicrobial Class Cephems		0)	Cecal (Market Hogs) Cecal (Sows)												21 33
Antimicrobial Class Cephems	Antimicrobial (Resistance		Isolate												
	Breakpoint)		Source												
	Ceftriaxone (MIC ≥ 4 µg/mI)		Humans	0.0% 0	0.0%	0.0% 0	0.0% 0		0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0%
		S	Retail					0.0%							
		Chickens	HACCP	0.0%	0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	
		S	Cecal	U	0		0	0	0			U	U	0	
			Retail				0.0%								
		ske					0.0%	0.0%	100.0%		0.0%			0.0%	
		Turkeys	HACCP				0.0%	0.076	1		0.076			0.078	
		Ĺ	Cecal												
			Retail					0.0%							
		<u>e</u>	HACCP	0.0%		0.0%		0.0%				100.0%		0.0%	0.0%
		Cattle	Cecal (Beef)	U		0		U						U	U
			Cecal (Dairy)												
					0.0%					0.0%					0.0%
			Retail		0					0					0.078
		Swine	HACCP	0.0%	0.0% 0	0.0% 0	6.7% 1	6.9% 2	9.1% 2	0.0% 0	9.1% 1	0.0%	0.0% 0		
			Cecal (Market Hogs)												4.8% 1
			Cecal (Sows)												0.0%
Folate Pathway Inhibitor	Sulfamethoxazole/		Humans	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%
	Sulfisoxazole <sup>2</sup> (MIC ≥ 512 µg/mI)		I	0	0	0	0	0.0%	0	0	0	0	0	1	0
		ens	Retail	0.0%	66.7%		100.0%	0 100.0%	100.0%			25.0%	66.7%	0.0%	
		Chickens	HACCP	0.070	2		3	2	1			2	4	0.070	
			Cecal												
		"	Retail				0.0%								
		Turkeys	HACCP				100.0%	50.0% 1	0.0%		100.0% 1			100.0%	
		₽	Cecal					1	U					2	
			Retail					0.0%							
				0.0%	0.0%	0.0%		0.0%				100.0%		0.0%	50.0%
		Cattle	HACCP	0	0	0.070		0.070				1		0.070	1
		O	Cecal (Beef)												
		L	Cecal (Dairy)												
			Retail		0.0%					0.0%					0.0%
		Ф	HACCP	0.0%	0.0%	0.0%	0.0%	3.4%	4.5%	0.0%	0.0%	0.0%	0.0%		
		Swine	Cecal (Market Hogs)	0	0	0	0	1	1	0	0	0	0		0.0%
															0.0%
	Trimethoprim-	1	Cecal (Sows)	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Sulfamethoxazole		Humans	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	(MIC ≥ 4 / 76 μg/mI)	SI	Retail					0.0%							
		Chickens	HACCP	0.0%	0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	
		ర్	Cecal	U			U							U	
			Retail				0.0%								
		eys					0.0%	0.0%	0.0%		0.0%			0.0%	
		Turkeys	HACCP				0.070	0.076	0.076		0.070			0.070	
			Cecal												
			Retail					0.0%							
		<u>a</u>	HACCP	0.0%		0.0%		0.0%				100.0% 1		0.0%	0.0%
		Cattle	Cecal (Beef)	U										U	
			Cecal (Dairy)												
		-			0.0%					0.0%					0.0%
			Retail	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.070
		Swine	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.004
		Š	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low <sup>2</sup> Sulfamethoxazole was tested from 1996-2003 and was replaced by sulfisoxazole in 2004

Table 64d. Antimicrobial Resistance among Salmonella Johannesburg Isolates, 2002-2013

Table 64d. Antimicro	obial Resistance amo	ong :	Salmonella Johan												
Year	fod		Humans	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b> 7	<b>2008</b>	<b>2009</b> 5	<b>2010</b>	<b>2011</b>	<b>2012</b> 5	<b>2013</b>
Number of Isolates Test	ted	SI													
		Chickens	Retail HACCP	0 4	0	0	0	1 2	0	0	0	0 8	0 6	0 1	0
			Cecal					_							0
		eys	Retail	0	0	0	1	0	0	0	0	0	0	0	0
		Turkeys	HACCP	1	0	2	0	1	0	0	0	1	0	2	2
		F	Cecal												0
		e	Retail Ground Beef HACCP	0	0	0 2	0	1	0	0	0	0	0	0 2	0 2
		Cattle	Cecal (Beef)		0	2	0			Ü			U	2	0
			Cecal (Dairy)												0
		0	Retail Pork Chops	0	2	0	0	0	0	2	0	0	0	0	3
		Swine	HACCP <sup>1</sup>	15	10	11	15	29	22	5	11	8	12		24
		0	Cecal (Market Hogs) Cecal (Sows)												21 33
	Antimicrobial														
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
Macrolides	Azithromycin (MIC ≥32 µg/mI)		Humans										0.0%	0.0%	0.0%
	(IVIIC 232 µg/IIII)		Retail										U	0	U
		Chickens	HACCP										0.0%	0.0%	
		Shick											0	0	
		Ĺ	Cecal												
		s	Retail												
		Turkeys	HACCP											0.0%	
		ı	Cecal												
		-	Retail												
														0.0%	0.0%
		Cattle	HACCP											0	0.070
		Ö	Cecal (Beef)												
			Cecal (Dairy)												
			Retail												0.0%
		m	HACCP										0.0%		0
		Swine											0		0.0%
		"	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0
Penicillins	Ampicillin (MIC ≥ 32 µg/mI)		Humans	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	50.0% 1	0.0%	0.0%	0.0%
			Retail					0.0%							
		Chickens	HACCP	0.0%	0.0%		0.0%	0.0%	0.0%			0.0%	16.7%	0.0%	
		Chic		0	0		0	0	0			0	1	0	
			Cecal				0.00/								
		<sub>ω</sub>	Retail				0.0%								
		Turkeys	HACCP				0.0%	0.0%	100.0%		0.0%			0.0%	
		F	Cecal												
		-	Retail					0.0%							
				0.0%		0.0%		0.0%				100.0%		0.0%	0.0%
		Cattle	HACCP	0.0%		0.0%		0.0%				100.0%		0.0%	0.0%
		ပိ	Cecal (Beef)												
			Cecal (Dairy)												
		$\vdash$	Retail		0.0%					0.0%					0.0%
				0.0%	0.0%	0.0%	6.7%	10.3%	9.1%	0.0%	9.1%	0.0%	0.0%		0
		Swine	HACCP	0.0 %	0.078	0.078	1	3	2	0.078	1	0.078	0.078		4.0
		Ø	Cecal (Market Hogs)												4.8% 1
			Cecal (Sows)												0.0% 0
Phenicols	Chloramphenicol	1	Humans	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	(MIC ≥ 32 μg/mI)	-	1	0	0	0	0	0.0%	0	0	0	0	0	0	0
		sus.	Retail	0.007	0.00/		0.0%	0.0%	0.007			0.00/	0.0%	0.007	
		Chickens	HACCP	0.0% 0	0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	
		0	Cecal												
			Retail				0.0%								
		Turkeys	HACCP				100.0%	0.0%	0.0%		0.0%			0.0%	
		Ę					1	0	0		0			0	
			Cecal												
			Retail					0.0%							
		<u>o</u>	HACCP	0.0%	0.0% 0	0.0% 0		0.0%				100.0% 1		0.0%	0.0%
		Cattle	Cecal (Beef)	U	U	U								J	U
		1	20001 (2001)												
			Cecal (Dairy)		6								_		
			Cecal (Dairy) Retail		0.0%					0.0%					0.0%
		ЭС		0.0%	0.0%	0.0%	0.0%	3.4%	4.5%	0.0%	0.0%	0.0%	0.0%		
		Swine	Retail HACCP	0.0%	0	0.0%	0.0%	3.4%	4.5% 1	0	0.0%	0.0%	0.0%		0.0%
		Swine	Retail		0.0%					0.0%					0

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Year	Obiai Resistance an	nong .	Salmonella Johan	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Te	sted		Humans	1	2	2	3	0	7	3	5	2	1	5	1
		Chickens	Retail HACCP Cecal	0 4	0 3	0	0 3	1 2	0	0	0	0 8	6	0	0 0 0
		Turkeys	Retail HACCP Cecal	0	0	0	1	0 2	0	0	0 1	0	0	0 2	0 0 0
		Cattle	Retail Ground Beef HACCP Cecal (Beef)	0	0	0 2	0	1	0	0	0	0	0	0 2	0 2 0
		Swine	Cecal (Dairy)  Retail Pork Chops  HACCP¹  Cecal (Market Hogs)	0 15	2 10	0 11	0 15	0 29	0 22	2 5	0 11	0	0 12	0	0 3 21
	Antimicrobial		Cecal (Sows)												33
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
Quinolones	Ciprofloxacin (MIC ≥ 1 µg/mI)		Humans	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	(WIIO E 1 pg/III)	s	Retail			0		0.0%			J			0	Ů
		Chickens	HACCP	0.0%	0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	
		5	Cecal										-	-	
		s	Retail				0.0% 0								
		Turkeys	HACCP				0.0%	0.0%	0.0%		0.0% 0			0.0% 0	
		-	Cecal												
			Retail					0.0%							
		Cattle	HACCP	0.0% 0		0.0%		0.0%				0.0%		0.0%	0.0%
		ပိ	Cecal (Beef)												
			Cecal (Dairy)												
			Retail		0.0%					0.0%					0.0%
		Swine	HACCP	0.0%	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
	Nalidixic Acid	Ś	Cecal (Market Hogs)												0.09
			Cecal (Sows)	0.00/	0.00/	0.00/	0.00/		0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.09
	(MIC ≥ 32 µg/mI)		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		ens	Retail	0.0%	0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	
		Chickens	HACCP	0.078	0.078		0.078	0.078	0.078			0.078	0.078	0.078	
			Cecal				0.0%								
		eys	Retail				0.0%	0.0%	0.0%		0.0%			0.0%	
		Turkeys	HACCP				0	0	0		0.070			0	
			Cecal					0.0%							
			HACCP	0.0%		0.0%		0.0%				0.0%		0.0%	0.0%
		Cattle	Cecal (Beef)	0		0		0				0		0	0
			Cecal (Dairy)												
		-	Retail		0.0%					0.0%					0.0%
		0	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0
		Swine	Cecal (Market Hogs)	0	0	0	0	0	0	0	0	0	0		0.0%
			Cecal (Sows)												0.0%
Tetracyclines	Tetracycline		Humans	100.0%	50.0%	0.0%	33.3%		28.6%	66.7%	60.0%	50.0%	100.0%	20.0%	0.0%
	(MIC ≥ 16 μg/mI)	-	Retail	1	1	0	1	0.0%	2	2	3	1	1	1	0
		Chickens	HACCP	0.0%	33.3%		100.0%	50.0% 1	0.0%			0.0%	16.7%	0.0%	
		S	Cecal	0	1		3					0	'	0	
			Retail				0.0%								
		Turkeys	HACCP				100.0%	50.0%	100.0% 1		0.0%			100.0% 2	
		ĭ	Cecal												
			Retail					100.0% 1							
		e H	HACCP	0.0%		0.0%		0.0%				100.0% 1		0.0%	100.0 2
		Cattle	Cecal (Beef)												
			Cecal (Dairy)												
			Retail		100.0% 2					50.0% 1					0.0%
		ine	HACCP	13.3% 2	10.0%	27.3% 3	66.7% 10	37.9% 11	54.5% 12	40.0% 2	54.5% 6	25.0% 2	58.3% 7		
		Swine	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												9.1% 3

<sup>1</sup> in 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 65a. Resistance Patte			2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	1	2	2	3	0	7	3	5	2	1	5	1
	tens	Retail Chickens	0	0	0	0	1	0	0	0	0	0	0	0
	Chickens	HACCP Cecal	4	3	0	3	2	1	0	0	8	6	1	0
	eys	Retail Ground Turkey	0	0	0	1	0	0	0	0	0	0	0	0
	Turkeys	HACCP Cecal	0	0	0	1	2	1	0	1	0	0	2	0
	۵	Retail Ground Beef	0	0	0	0	1	0	0	0	0	0	0	0
	Cattle	HACCP Cecal (Beef)	1	0	2	0	1	0	0	0	1	0	2	0
	-	Cecal (Dairy)  Retail Pork Chops		0									0	0
	Swine	HACCP <sup>2</sup>	0 15	2 10	0 11	0 15	0 29	0 22	2 5	0 11	0 8	0 12	U	3
	Sw	Cecal (Market Hogs) Cecal (Sows)												21 33
Resistance Pattern		Source	0.0%	50.0%	1.0%	0.7%		57.1%	33.3%	40.0%	50.0%	0.0%	80.0%	100.0%
1. No Resistance Detected	<u> </u>	Humans	0	1	2	2	100.0%	4	1	2	1	0	4	1
	sue	Retail Chickens	100.0%	33.3%		0.0%	1 0.0%	0.0%			37.5%	16.7%	100.0%	
	Chickens	HACCP	4	1		0.0%	0.0%	0.0%			37.5%	10.7 %	1	
	<u> </u>	Cecal												
	s,	Retail Ground Turkey				100.0% 1								
	Turkeys	HACCP				0.0% 0	50.0% 1	0.0%		0.0% 0			0.0%	
		Cecal												
		Retail Ground Beef					0.0%							
	Cattle	HACCP	100.0% 1		100.0% 2		100.0% 1				0.0%		100.0%	0.0%
	Ca	Cecal (Beef)												
		Cecal (Dairy)												
	┢	Retail Pork Chops		0.0%					50.0%					100.0%
		HACCP	80.0%	90.0%	72.7%	33.3%	58.6%	40.9%	60.0%	36.4%	75.0%	41.7%		1
	Swine	Cecal (Market Hogs)	12	9	8	5	17	9	3	4	6	5		95.2%
		Cecal (Sows)												90.9%
	┢	Humans	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%
2. Resistant to ≥ 3 Antimicrobial Classes	_	Retail Chickens	0	0	0	0	0.0%	0	0	0	0	0	1	0
	Chickens	HACCP	0.0%	33.3%		100.0%	0 50.0%	0.0%			0.0%	16.7%	0.0%	
	Chic		0	1		3	1	0			0	1	0	
	<u> </u>	Cecal				0.0%								
	ske	Retail Ground Turkey				0	50.0%	100.0%		0.0%			100.0%	
	Turkeys	HACCP				1	1	1		0.070			2	
	<u> </u>	Cecal					0.09/							
		Retail Ground Beef	0.00/		0.00/		0.0%				100.00/		0.00/	50.00/
	Cattle	HACCP	0.0%		0.0% 0		0.0% 0				100.0% 1		0.0%	50.0% 1
	0	Cecal (Beef)												
		Cecal (Dairy)												
		Retail Pork Chops		0.0%					0.0% 0					0.0%
	Swine	HACCP	0.0% 0	0.0% 0	0.0% 0	6.7% 1	10.3% 3	13.6% 3	0.0% 0	9.1% 1	0.0% 0	0.0% 0		
	Š	Cecal (Market Hogs)												4.8% 1
		Cecal (Sows)												0.0%
3. Resistant to ≥ 4		Humans	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Antimicrobial Classes	s	Retail Chickens					0.0%							
	Chickens	HACCP	0.0%	0.0%		0.0%	0.0% 0	0.0%			0.0%	0.0% 0	0.0%	
	ΰ	Cecal	-			-	-	-				-		
	<u> </u>	Retail Ground Turkey				0.0%								
	Turkeys	HACCP				100.0%	0.0%	100.0%		0.0%			0.0%	
	F	Cecal												
		Retail Ground Beef					0.0%							
	e te	HACCP	0.0%		0.0%		0.0%				100.0% 1		0.0%	0.0%
	Cattle	Cecal (Beef)												
		Cecal (Dairy)												
	Г	Retail Pork Chops		0.0%					0.0%					0.0%
	g.	HACCP	0.0%	0.0%	0.0%	6.7%	6.9%	9.1%	0.0%	0.0%	0.0%	0.0%		0
	Swine	Cecal (Market Hogs)	0	0	0	1	2	2	0	0	0	0		0.0%
		Cecal (Sows)												0.0%
1 Starting in 2011, testing included	<u> </u>		th the ed-list	n of the r	orolido o=i#5	romusin De	ougo roo!	noo to o=it-	romunin in !=:	u (in thin	40()			0

Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 65b. Resistance Patterns among Salmonella Johannesburg Isolates, 2002-2013<sup>1</sup>

Year		among Salmoneli	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested	s .	Humans Pateil Chiefean	1	2	2	3	0	7	3	5	2	1	5	1
	Chickens	Retail Chickens HACCP Cecal	0 4	3	0	3	1 2	1	0	0	0 8	0 6	0 1	0 0 0
	Turkeys	Retail Ground Turkey HACCP Cecal	0	0	0	1	0 2	0 1	0	0 1	0	0	0 2	0 0 0
	Cattle	Retail Ground Beef HACCP Cecal (Beef)	0 1	0	0 2	0	1 1	0	0	0	0	0	0 2	0 2 0
	Swine	Cecal (Dairy)  Retail Pork Chops  HACCP <sup>2</sup> Cocal (Market Lloss)	0 15	2 10	0 11	0 15	0 29	0 22	2 5	0 11	0 8	0 12	0	3
	S	Cecal (Market Hogs) Cecal (Sows)												21 33
Resistance Pattern		Source Humans	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4. Resistant to ≥ 5 Antimicrobial Classes			0	0	0	0	0.0%	0	0	0	0	0	0	0
	ens	Retail Chickens	0.0%	0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	
	Chickens	HACCP	0.070	0.070		0.070	0.070	0.070			0.0 %	0.070	0.070	
		Cecal												
	s/	Retail Ground Turkey				0.0%								
	Turkeys	HACCP				0.0%	0.0%	0.0% 0		0.0%			0.0%	
	Ť	Cecal												
		Retail Ground Beef					0.0%							
	tle	HACCP	0.0%		0.0%	0.0%	0.0%				100.0% 1		0.0%	0.0%
	Cattle	Cecal (Beef)	U		U	J	J						U	U
		Cecal (Dairy)												
		Retail Pork Chops		0.0%					0.0%					0.0%
			0.0%	0.0%	0.0%	0.0%	3.4%	4.5%	0.0%	0.0%	0.0%	0.0%		0
	Swine	HACCP	0	0	0	0	1	1	0	0	0	0		0.0%
	0,	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0
5. At Least ACSSuT <sup>3</sup> Resistant		Humans	0.0%	0.0%	0.0%	0.0%		0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%
	SI	Retail Chickens					0.0% 0							
	Chickens	HACCP	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%			0.0% 0	0.0%	0.0%	
	O	Cecal												
		Retail Ground Turkey				0.0%								
	Turkeys	HACCP				0.0%	0.0%	0.0%		0.0%			0.0%	
	Ţ	Cecal				U	U	U		U			0	
		Retail Ground Beef					0.0%							
	e	HACCP	0.0%		0.0%		0.0%				100.0%		0.0%	0.0%
	Cattle	Cecal (Beef)	0		0		0				1		0	0
		Cecal (Dairy)												
		Retail Pork Chops		0.0%					0.0%					0.0%
		HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0
	Swine	Cecal (Market Hogs)	0	0	0	0	0	0	0	0	0	0		0.0%
		Cecal (Sows)												0.0%
		Humans	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6. At Least ACT/S <sup>4</sup> Resistant		Retail Chickens	0	0	0	0	0.0%	0	0	0	0	0	0	0
	Chickens	HACCP	0.0%	0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	
	Chic	Cecal	0	0		0	0	0			0	0	0	
		Retail Ground Turkey				0.0%								
	ceys	HACCP				0.0%	0.0%	0.0%		0.0%			0.0%	
	Turkeys	Cecal				0	0	0		0			0	
		Retail Ground Beef					0.0%							
			0.0%		0.0%		0.0%				100.0%		0.0%	0.0%
	Cattle	HACCP	0		0		0				1		0	0
		Cecal (Beef)												
		Cecal (Dairy)		0.0%					0.0%					0.0%
		Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.070
	Swine	HACCP	0.0 %	0.078	0.0%	0.0%	0.0 %	0.0%	0.0%	0.0%	0.0 %	0.0%		0.0%
	S	Cecal (Market Hogs)												0
		Cecal (Sows) ntimicrobial classes wi												0.0%

<sup>&</sup>lt;sup>1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

<sup>2</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low

<sup>&</sup>lt;sup>3</sup> ACSSuT = ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline <sup>4</sup> ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole

Table 65c. Resistance Patterns among Salmonella Johannesburg Isolates, 2002-2013

Year	31113	among Samonen	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	1	2	2	3	0	7	3	5	2	1	5	1
	Chickens	Retail Chickens HACCP Cecal	0 4	0 3	0	0 3	1 2	0 1	0	0	0 8	0 6	0	0 0 0
	Turkeys	Retail Ground Turkey HACCP Cecal	0	0	0	1	0 2	0 1	0	0 1	0	0	0 2	0 0 0
	Cattle	Retail Ground Beef HACCP Cecal (Beef) Cecal (Dairy)	0 1	0	0 2	0	1	0	0	0	0	0	0 2	0 2 0 0
Resistance Pattern	Swine	Retail Pork Chops HACCP <sup>1</sup> Cecal (Market Hogs) Cecal (Sows) Source	0 15	2 10	0 11	0 15	0 29	0 22	2 5	0 11	0 8	0 12	0	3 21 33
		Humans	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7. At Least ACSSuTAuCx <sup>2</sup> Resistant	_	Retail Chickens	0	0	0	0	0.0%	0	0	0	0	0	0	0
	Chickens	HACCP	0.0%	0.0%		0.0%	0 0.0% 0	0.0%			0.0%	0.0%	0.0%	
	0	Cecal												
	s	Retail Ground Turkey				0.0%								
	Turkeys	HACCP				0.0%	0.0%	0.0%		0.0%			0.0% 0	
	Ľ	Cecal												
		Retail Ground Beef					0.0% 0							
	Cattle	HACCP	0.0%		0.0% 0		0.0% 0				100.0% 1		0.0% 0	0.0%
	Ö	Cecal (Beef)												
		Cecal (Dairy)												
		Retail Pork Chops		0.0%					0.0%					0.0% 0
	Swine	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%
	Ġ	Cecal (Market Hogs)												0.0%
		Cecal (Sows)	0.00/	0.00/	0.00/	0.00/		0.00/	0.00/	0.00/	0.09/	0.00/	0.00/	0
8. At Least Ceftriaxone and Nalidixic Acid Resistant		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nalidixic Acid Resistant	sua	Retail Chickens	0.0%	0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%	
	Chickens	HACCP	0.070	0.070		0.070	0.070	0.070			0	0	0.070	
	_	Cecal				0.0%								
	Turkeys	Retail Ground Turkey HACCP				0.0%	0.0%	0.0%		0.0%			0.0%	
	Ţ	Cecal				0	0	0		0			0	
	-	Retail Ground Beef					0.0%							
		HACCP	0.0%		0.0%		0.0%				0.0%		0.0%	0.0%
	Cattle	Cecal (Beef)	0		0		0				0		0	0
		Cecal (Dairy)												
	┢	Retail Pork Chops		0.0%					0.0%					0.0%
	je je	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		U
	Swine	Cecal (Market Hogs)		0	0	0	0	0		,				0.0%
		Cecal (Sows)												0.0%
		1												J

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low <sup>2</sup> ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

Table 66a. Antimicrobial Resistance among Salmonella Kentucky Isolates, 2002-201

				2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ted	10.	Humans	5	2	2	3	3	2	5	3	6	4	7	6
		Chickens	Retail HACCP Cecal	10 545	20 418	42 570	60 919	59 674	23 443	30 219	44 214	21 243	45 227	62 301	44 237 15
			Retail	3	4	1	2	1	2	0	2	2	2	1	2
		Turkeys	HACCP Cecal	4	9	6	5	8	1	1	2	0	2	1	0 1
		e	Retail HACCP	0 50	0 30	0 25	0 9	0 14	0 12	1 22	0 10	0 13	3 18	1 12	1 14
		Cattle	Cecal (Beef)	50	30	25	9	14	12	22	10	13	10	12	6
		_	Cecal (Dairy) Retail	0	0	0	0	0	0	0	0	0	0	1	15 0
		Swine	HACCP1 Cecal (Market Hogs) Cecal (Sows)	3	0	1	1	1	1	1	0	0	0		1 3
Antimicrobial Class	Antimicrobial (Resistance Breakpoint)		Isolate Source												
Aminoglycosides	Gentamicin (MIC ≥ 16 μg/mI)		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.3% 1	16.7% 1	25.0% 1	28.6%	50.0%
	(wild i To pg/iii)	s	Retail	0.0%	5.0%	2.4%	0.0%	8.5% 5	0.0%	6.7% 2	2.3%	4.8%	4.4%	6.5%	0.0%
		Chickens	HACCP	1.8% 10	2.6%	2.1% 12	1.4% 13	5.5% 37	3.4% 15	3.2% 7	2.3%	1.6%	1.3%	2.7%	0.8%
		ਠੰ	Cecal										-		0.0%
		s	Retail	33.3% 1	25.0% 1	0.0%	0.0%	0.0%	0.0%		50.0% 1	0.0%	0.0%	0.0%	0.0%
		Turkeys	HACCP	50.0% 2	22.2% 2	0.0% 0	20.0% 1	37.5% 3	0.0% 0	0.0%	0.0%		0.0% 0	0.0%	
		_	Cecal												0.0%
			Retail							0.0%			0.0%	0.0%	0.0%
		Cattle	HACCP	0.0% 0	0.0% 0										
		రొ	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0% 0
			Retail											0.0%	
		Swine	HACCP	0.0%		0.0%	0.0%	0.0% 0	0.0% 0	0.0% 0					0.00/
		Ś	Cecal (Market Hogs)												0.0%
			Cecal (Sows)	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	44.00/	0.0%
	Kanamycin (MIC ≥ 64 μg/mI)		Humans	0.0% 0 0.0%	0.0% 0 0.0%	0.0% 0 2.4%	0.0% 0 0.0%	0.0% 0 8.5%	0.0% 0 4.3%	0.0% 0 0.0%	0.0% 0 0.0%	0.0% 0 0.0%	0.0% 0 2.2%	14.3% 1 0.0%	0.0% 0 0.0%
		ens	Retail	0.0%	0.0%	2.4% 1 0.5%	0.5%	5 2.1%	4.3% 1 2.0%	0.0%	0.0%	0.0%	2.2% 1 0.0%	0.0%	0.0%
		Chickens	HACCP	3	2	3	5	14	9	4	5	0.0%	0.0%	0.0%	1 0.0%
		Ĺ	Cecal	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
		ske	Retail	1 25.0%	0.0%	0.0%	0.0%	0 12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.078
		Turkeys	HACCP	1	0	0.070	0	1	0.070	0.070	0.070		0.070	0.070	0.0%
			Cecal							0.0%			0.0%	0.0%	0.0%
			Retail	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	HACCP	0	0	0	0	0	0	0	0	0	0	0	0.0%
			Cecal (Beef) Cecal (Dairy)												0.0%
			Retail											0.0%	0
			HACCP	0.0%		0.0%	0.0%	0.0%	100.0%	0.0%				0	
		Swine	Cecal (Market Hogs)	0		0	0	0	1	0					0.0%
			Cecal (Sows)												0.0%
	Streptomycin		Humans	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	20.0%	33.3%	66.7%	25.0%	28.6%	0.0%
	(MIC ≥ 64 μg/mI)		Retail	30.0%	1 65.0%	0 52.4%	50.0%	0 69.5%	60.9%	66.7%	70.5%	81.0%	80.0%	87.1%	79.6%
		Chickens	HACCP	27.3%	13 21.5%	22 33.7%	30 36.3%	41 34.9%	14 32.5%	20 51.6%	31 54.7%	17 67.9%	36 69.2%	54 75.1%	35 81.0%
		Chic	Cecal	149	90	192	334	235	144	113	117	165	157	226	192 60.0%
		_	Retail	33.3%	50.0%	0.0%	50.0%	0.0%	50.0%		0.0%	0.0%	100.0%	0.0%	9 100.0%
		Turkeys	HACCP	75.0%	44.4%	16.7%	40.0%	25.0%	0.0%	0.0%	50.0%	0	0.0%	100.0%	2
		TuT	Cecal	3	4	1	2	2	0	0	1		0	1	0.0%
			Retail							0.0%			100.0%	0.0%	0.0% 0
		9	HACCP	14.0%	3.3%	4.0%	0.0%	14.3%	0.0%	4.5% 1	0.0%	23.1%	16.7% 3	8.3% 1	7.1%
		Cattle	Cecal (Beef)	,			U		0		J	3	3		0.0%
			Cecal (Dairy)												6.7%
			Retail											100.0%	
		Э	HACCP	0.0%		0.0%	0.0%	100.0%	0.0%	0.0%					
		1.5		U		U	U		U	U					0.0%
		Swine	Cecal (Market Hogs)												0.070

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 66h	Antimicrobial	Resistance among	Salmonolla	Kentuck	leolates	2002-2013
Table oob.	Anumicrobiai	Resistance among	Sallifoliella	Kentucky	/ ISUIALES,	2002-2013

	biai Resistance amo	ong .	Salmonella Kentud				2005	2000	2227	0000	0000	2012	2011	2012	2212
Year Number of Isolates Test	ed		Humans	<b>2002</b> 5	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b> 5	<b>2009</b>	<b>2010</b> 6	<b>2011</b> 4	<b>2012</b> 7	<b>2013</b>
rumber of isolates Test	-u	sus	Retail	10	20	42	60	59	23	30	44	21	45	62	44
		Chickens	HACCP	545	418	570	919	674	443	219	214	243	227	301	237
		$\vdash$	Cecal												15
		Turkeys	Retail HACCP	3 4	4 9	1 6	2 5	1 8	2	0	2 2	2	2 2	1	2
		TuT	Cecal	,	9		,			'					1
			Retail	0	0	0	0	0	0	1	0	0	3	1	1
		Cattle	HACCP	50	30	25	9	14	12	22	10	13	18	12	14
			Cecal (Beef) Cecal (Dairy)												6 15
			Retail	0	0	0	0	0	0	0	0	0	0	1	0
		Swine	HACCP1	3	0	1	1	1	1	1	0	0	0		
		Ó	Cecal (Market Hogs) Cecal (Sows)												1 3
	Antimicrobial														
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin- Clavulanic Acid		Humans	0.0%	0.0%	0.0%	0.0%	33.3% 1	0.0%	20.0%	0.0%	16.7% 1	0.0%	14.3% 1	33.3% 2
inibitor combinations	(MIC ≥ 32 / 16 μg/ml)		Retail	10.0%	25.0%	26.2%	21.7%	22.0%	8.7%	20.0%	36.4%	19.0%	28.9%	21.0%	15.9%
		Chickens	HACCP	10.6%	7.2%	9.6%	13 13.5%	13 15.4%	2 19.9%	6 11.0%	16 19.2%	4 15.2%	13 8.8%	13 18.3%	7 14.8%
		Chic		58	30	55	124	104	88	24	41	37	20	55	35 6.7%
			Cecal	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
		ys	Retail	1	0	0	0	0	0		0	0.0%	0	0	0.0%
		Turkeys	HACCP	0.0%	0.0% 0	0.0% 0	0.0%	0.0%	0.0%	0.0% 0	0.0% 0		0.0% 0	100.0% 1	
		-	Cecal												0.0%
			Retail							0.0%			33.3%	0.0%	0.0%
			HACCP	4.0%	0.0%	0.0%	0.0%	14.3%	0.0%	0.0%	0.0%	0.0%	0.0%	8.3%	0.0%
		Cattle		2	0	0	0	2	0	0	0	0	0	1	0.0%
			Cecal (Beef)												0.0%
			Cecal (Dairy)												0.078
			Retail											0.0%	
		ne	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%					
		Swine	Cecal (Market Hogs)					, i	Ů	- J					0.0%
			Cecal (Sows)												0.0%
Cephems	Cefoxitin			0.0%	0.0%	0.0%	0.0%	33.3%	0.0%	20.0%	0.0%	16.7%	0.0%	14.3%	16.7%
	(MIC ≥ 32 μg/mI)		Humans	20.0%	0 25.0%	0 26.2%	0 21.7%	1 22.0%	0 8.7%	20.0%	0 36.4%	19.0%	0 31.1%	1 16.1%	1 13.6%
		sus	Retail	2	5	11	13	13	2	6	16	4	14	10	6
		Chickens	HACCP	8.1% 44	5.7% 24	9.6% 55	13.3% 122	15.1% 102	16.3% 72	10.5% 23	17.3% 37	14.8% 36	8.8% 20	14.6% 44	12.7% 30
		0	Cecal												0.0%
			Retail	33.3% 1	0.0% 0	0.0% 0	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	J
		₽	Cecal	0	0	0	0	0	0	0	0		0	0	0.0%
										0.0%			0.0%	0.0%	0.0%
			Retail	2.0%	0.0%	0.0%	0.0%	14.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		attle	HACCP	1	0.078	0.078	0.078	2	0.076	0.078	0.076	0.078	0.078	0.076	0
		ő	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail											0.0%	Ť
		m	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%				U	
		Swine	Cecal (Market Hogs)	0		0	0	0	0	0					0.0%
		"	, ,,												0.0%
	Cofficient		Cecal (Sows)	0.00/	0.00/	0.00/	0.00/	22.20/	0.007	20.00/	0.007	10 70/	0.00/	0.007	0
	Ceftiofur (MIC ≥ 8 μg/mI)		Humans	0.0%	0.0%	0.0%	0.0%	33.3% 1	0.0%	20.0%	0.0%	16.7% 1	0.0%	0.0%	16.7% 1
		St	Retail	20.0%	25.0% 5	26.2% 11	21.7% 13	22.0% 13	8.7% 2	20.0%	36.4% 16	19.0% 4	28.9% 13	19.4% 12	15.9% 7
		Chickens	HACCP	10.8% 59	7.4% 31	9.6% 55	13.5% 124	15.3% 103	19.9% 88	11.0% 24	18.7% 40	15.2% 37	8.4% 19	15.6% 47	13.1% 31
		ပ်	Cecal	33	31	33	124	103	00	24	40	31	13	41	6.7%
			Retail	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
		eys		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0.0%	0.0%	0
		Turkeys	HACCP	0.070	0	0	0.070	0.070	0	0.070	0.070		0.070	0	0.0%
			Cecal										0.7.7		0
			Retail							0.0% 0			33.3% 1	0.0% 0	0.0%
		ŧ.	HACCP	4.0% 2	0.0% 0	0.0% 0	0.0% 0	14.3% 2	0.0%	0.0% 0	0.0%	0.0% 0	0.0% 0	8.3% 1	0.0%
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
														0.0%	0
			Retail	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%				0	
		Swine	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%					0.007
		Ś	Cecal (Market Hogs)												0.0% 0
			Cecal (Sows)												0.0%
		٠.	Imonella hecause in prid												

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Year	obial Resistance am	3		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	ted	Е	Humans	5	2	2	3	3	2	5	3	6	4	7	6
		kens	Retail	10	20	42	60	59	23	30	44	21	45	62	44
		Chickens	HACCP Cecal	545	418	570	919	674	443	219	214	243	227	301	237 15
			Retail	3	4	1	2	1	2	0	2	2	2	1	2
		Turkeys	HACCP	4	9	6	5	8	1	1	2	0	2	1	0
		Ĕ	Cecal												1
		Ф	Retail Ground Beef	0	0	0	0	0	0	1	0	0	3	1	1
		Cattle	HACCP Cecal (Beef)	50	30	25	9	14	12	22	10	13	18	12	14 6
			Cecal (Dairy)												15
			Retail Pork Chops	0	0	0	0	0	0	0	0	0	0	1	0
		Swine	HACCP <sup>1</sup>	3	0	1	1	1	1	1	0	0	0		,
		0,	Cecal (Market Hogs) Cecal (Sows)												3
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class	Breakpoint)		Source												
Cephems	Ceftriaxone (MIC ≥ 4 µg/mI)		Humans	0.0%	0.0%	0.0%	0.0%	33.3% 1	0.0%	20.0%	0.0%	16.7% 1	0.0%	0.0%	16.7% 1
	, , ,		Retail	20.0%	25.0%	26.2%	23.3%	22.0%	8.7%	20.0%	36.4%	19.0%	28.9%	21.0%	15.9% 7
		Chickens	HACCP	10.5%	7.2%	9.5%	14 13.6%	13 15.3%	19.9%	6 11.0%	16 19.2%	4 15.2%	13 8.8%	13 18.3%	14.3%
		Chic		57	30	54	125	103	88	24	41	37	20	55	34 6.7%
			Cecal	00.00/	0.004	0.00/	0.00/	0.00/	0.00/		0.00/	0.00/	0.00/	0.00/	1
		s	Retail	33.3% 1	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	
		Ē	Cecal				-	-					-		0.0%
		-	Retail							0.0%			33.3%	0.0%	0.0%
				4.0%	0.0%	0.0%	0.0%	14.3%	0.0%	0.0%	0.0%	0.0%	1 0.0%	0 8.3%	0.0%
		Cattle	HACCP	2	0.078	0.0%	0.078	2	0.0%	0.078	0.078	0.078	0.078	1	0
		ပိ	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail											0.0%	0
				0.0%		0.0%	0.0%	0.0%	0.0%	0.0%				0	
		Swine	HACCP	0		0.070	0.070	0.070	0.070	0					
		Ø	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
Folate Pathway Inhibito	Sulfamethoxazole/		Humans	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%	16.7%	25.0%	28.6%	50.0%
	Sulfisoxazole <sup>2</sup> (MIC ≥ 512 µg/ml)		I	0.0%	5.0%	0 4.8%	0.0%	0 8.5%	0 4.3%	6.7%	4.6%	0.0%	8.9%	4.8%	0.0%
	, ,	sue	Retail	0 2.2%	1 3.8%	3.3%	0 2.2%	5 6.2%	3.8%	2 4.1%	2.3%	0	4 1.3%	3.7%	0 2.1%
		Chickens	HACCP	12	16	19	2.2%	42	17	9	5	4	3	11	5
		0	Cecal												6.7%
			Retail	33.3%	25.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	100.0%	0.0%
		Turkeys	HACCP	25.0%	22.2%	0 66.7%	20.0%	0 87.5%	0.0%	100.0%	100.0%	0	0.0%	0.0%	0
		Ţ		1	2	4	1	7	0	1	2		0	0	0.0%
			Cecal							0.00/			0.00/	0.00/	0
			Retail							0.0%			0.0%	0.0%	0.0%
		<u>0</u>	HACCP	4.0%	0.0%	4.0%	0.0%	7.1% 1	0.0%	0.0%	0.0%	0.0%	0.0%	8.3%	0.0%
		Cattle	Cecal (Beef)		Ü		0	,	U	U	Ü	0	0		0.0%
			Cecal (Dairy)												0.0%
														0.0%	0
			Retail											0.0%	
		ne.	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%					
		Swine	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
	Trimethoprim-			0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.7%	0.0%	0.0%	0.0%
	Sulfamethoxazole		Humans	0	1	0	0	0	0	0	0	1	0	0	0
	(MIC ≥ 4 / 76 μg/mI)	S	Retail	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.2%	0.0%	0.0%
		Chickens	HACCP	0.6%	0.0%	0.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.4%
		S	Cecal	3	0	1	0	1	0	0	0	0	0	3	6.7%
		-	Retail	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
		3ys		0.0%	0.0%	0.0%	0.0%	0 12.5%	0.0%	0.0%	0.0%	0	0.0%	0.0%	0
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	12.5%	0.0%	0.0%	0.0%		0.0%	0.0%	
		'-	Cecal												0.0%
			Retail							0.0%			0.0%	0.0%	0.0%
			HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle		0	0	0	0	0	0	0	0	0	0	0	0.0%
			Cecal (Beef)												0
		L	Cecal (Dairy)												0.0%
			Retail											0.0%	
		Ф	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%					
		Swine	Cecal (Market Hogs)	U		0	0	U	U	0					0.0%
		,	2 3000 (market riogs)												0
			Cecal (Sows)												0.0%

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low <sup>2</sup> Sulfamethoxazole was tested from 1996-2003 and was replaced by sulfisoxazole in 2004

Year	obial Resistance am	iong .	Saimonella Kentu	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	ted		Humans	5	2	2	3	3	2	5	3	6	4	7	6
		Chickens	Retail	10	20	42	60	59	23	30	44	21	45	62	44
		Chic	HACCP Cecal	545	418	570	919	674	443	219	214	243	227	301	237 15
		ske	Retail	3	4	1	2	1	2	0	2	2	2	1	2
		Turkeys	HACCP Cecal	4	9	6	5	8	1	1	2	0	2	1	0
		Ė	Retail Ground Beef	0	0	0	0	0	0	1	0	0	3	1	6
		Cattle	HACCP	50	30	25	9	14	12	22	10	13	18	12	14
		ပၱ	Cecal (Beef) Cecal (Dairy)												6 15
			Retail Pork Chops	0	0	0	0	0	0	0	0	0	0	1	0
		Swine	HACCP <sup>1</sup>	3	0	1	1	1	1	1	0	0	0		
		Ø	Cecal (Market Hogs) Cecal (Sows)												1 3
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class	Breakpoint)		Source												
Macrolides	Azithromycin (MIC ≥32 µg/mI)		Humans										0.0% 0	0.0%	0.0% 0
		su	Retail										2.2% 1	0.0%	0.0% 0
		Chickens	HACCP										0.0%	0.0%	0.0% 0
		ō	Cecal												0.0%
		s	Retail										0.0%	0.0%	0.0%
		Turkeys	HACCP										0.0%	0.0%	
		Ĕ	Cecal												0.0%
			Retail										0.0%	0.0%	0.0%
		<u>e</u>	HACCP										0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)											0	0.0%
			Cecal (Dairy)												0.0%
			Retail											0.0%	0
		Ф	HACCP											0	
		Swine	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
Penicillins	Ampicillin	+	Humans	0.0%	0.0%	0.0%	0.0%	33.3%	0.0%	20.0%	33.3%	33.3%	25.0%	71.4%	50.0%
	(MIC ≥ 32 μg/ml)	-		20.0%	0 25.0%	0 28.6%	0 21.7%	1 22.0%	0 8.7%	20.0%	1 38.6%	2 19.1%	1 28.9%	5 22.6%	3 15.9%
		ens	Retail	11.4%	5 8.4%	12	13 14.4%	13 16.2%	20.1%	6 11.4%	17 19.6%	4 15.2%	13 8.8%	14 19.3%	7 14.8%
		Chickens	HACCP	62	35	62	132	10.278	89	25	42	37	20	58	35
		Ľ	Cecal												6.7% 1
		é	Retail	33.3% 1	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0		50.0% 1	0.0% 0	0.0% 0	0.0%	0.0%
		Turkeys	HACCP	0.0%	11.1% 1	0.0%	20.0%	12.5% 1	0.0%	0.0%	0.0%		0.0%	100.0% 1	
		-	Cecal												0.0%
			Retail							0.0%			33.3% 1	0.0%	0.0% 0
		<u>0</u>	HACCP	4.0% 2	0.0%	0.0% 0	0.0%	14.3% 2	0.0%	0.0%	0.0%	0.0%	0.0%	8.3%	0.0%
		Cattle	Cecal (Beef)			0	0		0	0	0	0	0		0.0%
			Cecal (Dairy)												0.0%
			Retail											0.0%	0
			HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%				0	
		Swine	Cecal (Market Hogs)	0		0	0	0	0	0					0.0%
		"	Cecal (Narket Hogs)												0.0%
Phenicols	Chloramphenicol			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.3%	0.0%
Filellicois	(MIC ≥ 32 µg/ml)		Humans	0.0%	0.0%	0.0%	0.0%	0 6.8%	0.0%	0.0%	0.0%	0.0%	0 2.2%	1 0.0%	0.0%
		sus.	Retail	0	0	0	0	4	0	0	0	0	1	0	0
		Chickens	HACCP	0.4%	0.2% 1	0.7% 4	0.5% 5	1.8% 12	2.0%	2.3% 5	1.9% 4	1.2% 3	0.4% 1	0.0%	0.4%
			Cecal												0.0%
		ş	Retail	0.0%	0.0% 0	0.0% 0	0.0%	0.0%	0.0% 0		0.0%	0.0%	0.0% 0	0.0%	0.0% 0
		Turkeys	HACCP	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0		0.0% 0	0.0%	
		F	Cecal												0.0%
			Retail							0.0%			0.0%	0.0%	0.0%
		m	HACCP	2.0%	0.0%	0.0%	0.0%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)	1	0	0	0	1	0	0	0	0	0	0	0.0%
			Cecal (Dairy)												0.0%
		-												0.0%	0
			Retail	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%				0.070	
		Swine	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%					0.00/
		Ś	Cecal (Market Hogs)												0.0%
		╧	Cecal (Sows)												0.0% 0
1	FI	4 C-	monella because in prid	or venero the	norcent o				C-/						

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

ear umber of Isolates Te	sted		Humans	<b>2002</b> 5	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b> 5	<b>2009</b>	<b>2010</b>	<b>2011</b> 4	<b>2012</b> 7	20
umber of isolates 16:	Jiou	Chickens	Retail HACCP	10 545	20 418	42 570	60 919	59 674	23 443	30 219	44 214	21 243	45 227	62 301	2
			Cecal Retail	3	4	1	2	1	2	0	2	2	2	1	
		Turkeys	HACCP Cecal	4	9	6	5	8	1	1	2	0	2	1	
		Cattle	Retail Ground Beef HACCP Cecal (Beef)	0 50	30	0 25	9	0 14	0 12	1 22	0 10	0 13	3 18	1 12	
		Swine	Cecal (Dairy)  Retail Pork Chops  HACCP <sup>1</sup> Cecal (Market Hogs)	0 3	0	0	0 1	0	0 1	0 1	0	0	0	1	
	Antimicrobial (Resistance		Cecal (Sows)												
imicrobial Class	Breakpoint) Ciprofloxacin		Source	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%	16.7%	25.0%	42.9%	5
	(MIC ≥ 1 μg/ml)		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1 0.0%	0.0%	0.0%	3 0.0%	(
		kens	Retail HACCP	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	(
		Chickens	Cecal	0	1	0	0	0	0	0	0	0	0	0	(
			Retail	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	(
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0.0%	0.0%	
		Ţ	Cecal	0	0	0	0	0	0	0	0		0	0	-
			Retail							0.0%			0.0%	0.0%	(
			HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	(
		Cattle	Cecal (Beef)	0	0	0	0	0	0	0	0	0	0	0	(
			Cecal (Dairy)												(
			Retail											0.0%	
		e e	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%				0	
		Swine	Cecal (Market Hogs)	0		0	0	0	0	0					-
			Cecal (Sows)												(
	Nalidixic Acid (MIC ≥ 32 µg/ml)		Humans	0.0%	0.0%	50.0% 1	0.0%	33.3% 1	0.0%	0.0%	33.3% 1	16.7% 1	25.0% 1	42.9% 3	5
	(WIIO 2 02 pg/III)	s	Retail	0.0%	0.0%	0.0%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	(
		Chickens	HACCP	0.6%	0.7%	0.2%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	(
		٥	Cecal												(
		s	Retail	0.0%	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0%		0.0%	0.0%	0.0% 0	0.0%	(
		Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	
		-	Cecal												(
			Retail							0.0%			0.0%	0.0%	(
		#e	HACCP	0.0%	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	(
		ပ္မ	Cecal (Beef)												
			Cecal (Dairy)												
			Retail	0.771		0.551	0.521	0.771	0.571	0.521				0.0%	
		Swine	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%					
		Š	Cecal (Market Hogs)												ď
racyalis	Totracualina		Cecal (Sows)	0.0%	E0.00/	0.00/	0.0%	20 00/	0.00/	40.0%	20.00/	66 70/	100.0%	42.9%	3
racyclines	Tetracycline (MIC ≥ 16 μg/mI)		Humans	0.0% 0 30.0%	50.0% 1 60.0%	0.0% 0 54.8%	0.0% 0 53.3%	33.3% 1 72.9%	0.0% 0 73.9%	40.0% 2 56.7%	33.3% 1 68.2%	66.7% 4 71.4%	100.0% 4 75.6%	42.9% 3 40.3%	6
		ens	Retail	34.9%	12 32.5%	23 37.5%	32 43.9%	43 47.2%	17 56.9%	17 51.1%	30 57.5%	15 69.5%	75.6% 34 72.2%	25 59.1%	7
		Chickens	HACCP	190	136	214	403	318	252	112	123	169	164	178	2
		Ě	Cecal	66.7%	50.0%	0.0%	100.0%	100.0%	100.0%		50.0%	50.0%	100.0%	100.0%	(
		eys	Retail	2 50.0%	2	0 100.0%	2 60.0%	1 87.5%	2 0.0%	100.0%	1 100.0%	1	2 50.0%	1 0.0%	Ĺ
		Turkeys	HACCP	2	9	6	3	7	0	1	2		1	0	(
		_	Cecal							0.0%			100.0%	0.0%	,
			Retail	30.0%	10.0%	48.0%	22.2%	35.7%	0.0%	0	0.0%	53.8%	3	0	1
		Cattle	HACCP	15	3	12	2	5	0	3	0	7	7	2	5
		Ĭ	Cecal (Beef)												1
			Cecal (Dairy)											0.0%	Ė
			Retail HACCP	0.0%		100.0%	0.0%	100.0%	100.0%	0.0%				0	
		Swine		0		1	0	1	1	0					(
		"	Cecal (Market Hogs)												

<sup>1</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Cecal (Sows)

Table 67a. Resistance Patt			2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested	s	Humans Retail Chickens	5 10	2 20	2 42	3 60	3 59	2 23	5 30	3 44	6 21	4 45	7 62	6 44
	Chickens	HACCP	545	418	570	919	674	443	219	214	243	227	301	237
		Cecal  Retail Ground Turkey	3	4	1	2	1	2	0	2	2	2	1	15 2
	Turkeys	HACCP	4	9	6	5	8	1	1	2	0	2	1	0
	F	Cecal  Retail Ground Beef	0	0	0	0	0	0	1	0	0	3	1	1 2
	Cattle	HACCP	50	30	25	9	14	12	22	10	13	18	12	14
	O	Cecal (Beef) Cecal (Dairy)												6 15
	Ф	Retail Pork Chops	0	0	0	0	0	0	0	0	0	0	1	0
	Swine	HACCP <sup>2</sup> Cecal (Market Hogs)	3	0	1	1	1	1	1	0	0	0		1
Resistance Pattern		Cecal (Sows) Source												3
1. No Resistance Detected		Humans	100.0% 5	0.0%	0.5%	1.0%	66.7%	100.0%	60.0%	66.7%	33.3% 2	0.0%	28.6% 2	33.3%
	-	Retail Chickens	70.0%	35.0% 7	45.2% 19	43.3% 26	23.7% 14	26.1% 6	26.7% 8	15.9% 7	14.3%	6.7%	11.3% 7	15.9% 7
	Chickens	HACCP	61.7% 336	63.2% 264	56.3% 321	49.3% 453	42.4% 286	33.4% 148	39.7% 87	34.6% 74	19.3% 47	18.1% 41	15.0% 45	13.1% 31
	ర్	Cecal	330	204	321	455	200	140	0/	74	41	41	45	33.3%
	┢	Retail Ground Turkey	0.0%	50.0%	100.0%	0.0%	0.0%	0.0%		50.0%	50.0%	0.0%	0.0%	0.0%
	Turkeys	HACCP	25.0%	0.0%	0.0%	40.0%	0 12.5%	100.0%	0.0%	0.0%	1	50.0%	0.0%	0
	Ē	Cecal	1	0	0	2	1	1	0	0		1	0	100.0%
	⊩	Retail Ground Beef							100.0%			0.0%	100.0%	100.0%
		HACCP	56.0%	86.7%	48.0%	77.8%	64.3%	100.0%	1 81.8%	100.0%	46.2%	0 55.6%	1 75.0%	2 78.6%
	Cattle	Cecal (Beef)	28	26	12	7	9	12	18	10	6	10	9	11 50.0%
		` '												3 80.0%
	<b> </b>	Cecal (Dairy)											0.0%	12
		Retail Pork Chops	100.0%		0.0%	100.0%	0.0%	0.0%	100.0%				0	
	Swine	HACCP	3		0.078	1	0.078	0.078	1					400.00/
	S	Cecal (Market Hogs)												100.0%
		Cecal (Sows)												100.0%
2. Resistant to ≥ 3	<u> </u>	Humans	0.0%	0.0%	0.0%	0.0%	33.3% 1	0.0%	20.0% 1	33.3% 1	33.3% 2	25.0% 1	28.6% 2	66.7% 4
Antimicrobial Classes	St	Retail Chickens	20.0%	25.0% 5	31.0% 13	23.3% 14	22.0% 13	13.0% 3	26.7% 8	38.6% 17	19.0% 4	37.8% 17	24.2% 15	15.9% 7
	Chickens	HACCP	12.7% 69	9.6% 40	12.3% 70	15.2% 140	17.4% 117	21.2% 94	13.2% 29	19.6% 42	16.0% 39	9.3% 21	20.3% 61	14.8% 35
		Cecal												6.7% 1
		Retail Ground Turkey	33.3% 1	0.0%	0.0%	0.0%	0.0%	0.0%		50.0% 1	0.0%	0.0%	0.0%	0.0%
	Turkeys	HACCP	0.0%	33.3% 3	0.0%	40.0% 2	50.0% 4	0.0%	0.0%	50.0% 1		0.0%	100.0% 1	
	-	Cecal												0.0%
		Retail Ground Beef							0.0% 0			33.3% 2	0.0%	0.0%
	e e	HACCP	4.0%	0.0%	0.0%	0.0%	14.3% 2	0.0%	0.0%	0.0%	0.0%	0.0%	8.3%	0.0%
	Cattle	Cecal (Beef)		3	3		_	<u> </u>	, and the second		, and the second	J	•	0.0%
		Cecal (Dairy)												0.0%
		Retail Pork Chops											0.0%	U
		HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%				0	
	Swine	Cecal (Market Hogs)	0		0	0	0	0	0					0.0%
		Cecal (Sows)												0.0%
		Humans	0.0%	0.0%	0.0%	0.0%	33.3%	0.0%	20.0%	33.3%	33.3%	25.0%	28.6%	0 50.0%
3. Resistant to ≥ 4 Antimicrobial Classes	$\vdash$	Retail Chickens	20.0%	0 25.0%	0 28.6%	20.0%	1 22.0%	0 8.7%	13.3%	1 27.3%	19.0%	1 15.6%	2 22.6%	3 13.6%
	kens	HACCP	9.5%	5 6.0%	12 7.4%	12 11.5%	13 13.6%	2 18.3%	4 9.6%	12 19.2%	4 14.0%	7.9%	14 10.3%	6 11.8%
	Chickens		52	25	42	106	92	81	21	41	34	18	31	28 6.7%
	<b> </b>	Cecal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	1 0.0%
	s/e:	Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%	0	0	0.0%	0.0%	0	0.0%	0 100.0%	0
	Turkeys	HACCP	0	0	0	0	1	0	0	0		0	1	0.0%
	⊩	Cecal  Retail Ground Beef							0.0%			33.3%	0.0%	0.0%
		HACCP	4.0%	0.0%	0.0%	0.0%	14.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0 8.3%	0.0%
	Cattle	Cecal (Beef)	2	0	0	0	2	0	0	0	0	0	1	0.0%
		Cecal (Dairy)												0.0%
	⊩												0.0%	0
		Retail Pork Chops	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%				0	
	Swine	HACCP	0		0	0	0	0	0					0.0%
	0)	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0.0%

Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

2 In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

Table 67b. Resistance Patte	21115	among Samionen	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		Humans	5	2003	2	3	3	2	5	3	6	4	7	6
	Chickens	Retail Chickens HACCP	10 545	20 418	42 570	60 919	59 674	23 443	30 219	44 214	21 243	45 227	62 301	44 237
	Turkeys	Retail Ground Turkey HACCP	3 4	4 9	1	2 5	1 8	2	0	2 2	2	2 2	1 1	15 2 0
	ı,	Cecal  Retail Ground Beef	0	0	0	0	0	0	1	0	0	3	1	1 2
	Cattle	HACCP Cecal (Beef) Cecal (Dairy)	50	30	25	9	14	12	22	10	13	18	12	14 6 15
	ne ne	Retail Pork Chops HACCP <sup>2</sup>	0	0	0	0	0	0	0	0	0	0	1	0
D. Liver D. Liver	Swine	Cecal (Market Hogs) Cecal (Sows) Source												1 3
Resistance Pattern	<u> </u>	Humans	0.0%	0.0%	0.0%	0.0%	33.3%	0.0%	20.0%	33.3%	33.3%	25.0%	28.6%	33.3%
4. Resistant to ≥ 5 Antimicrobial Classes	_	Retail Chickens	20.0%	20.0%	0 26.2%	0 18.3%	1 20.3%	0 8.7%	1 10.0%	1 25.0%	9.5%	1 13.3%	2 8.1%	2 11.4%
	suex		7.2%	4 3.1%	11 5.3%	11 6.5%	12 6.8%	2 8.4%	3 6.8%	11 12.6%	2 9.9%	6 5.3%	5 5.3%	5 8.9%
	Chickens	HACCP	39	13	30	60	46	37	15	27	24	12	16	21 0.0%
		Cecal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
	s,	Retail Ground Turkey	0	0	0	0	0	0		0	0.0%	0	0	0.0%
	Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0	0.0% 0	0.0% 0		0.0%	0.0%	
		Cecal												0.0%
		Retail Ground Beef							0.0%			33.3% 1	0.0%	0.0%
	ite :te	HACCP	2.0%	0.0%	0.0%	0.0%	14.3% 2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	Cecal (Beef)												0.0%
		Cecal (Dairy)												0.0%
	_	Retail Pork Chops											0.0%	0
		HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%				0	
	Swine	Cecal (Market Hogs)	0		0	0	0	0	0					0.0%
														0.0%
		Cecal (Sows)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.3%	0.0%
5. At Least ACSSuT <sup>3</sup> Resistant		Humans	0	0	0	0	0	0	0	0	0	0	1	0
	su	Retail Chickens	0.0%	0.0%	0.0%	0.0%	6.8% 4	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0%	0.0% 0
	Chickens	HACCP	0.2% 1	0.2% 1	0.5% 3	0.5% 5	1.8% 12	1.6% 7	1.8% 4	1.9% 4	1.2% 3	0.4% 1	0.0%	0.4% 1
	0	Cecal												0.0%
		Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0		0.0%	0.0%	0.0%	0.0%	0.0%
	Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Ů	0.0%	0.0%	
	F	Cecal	Ü	0	0		0							0.0%
		Retail Ground Beef							0.0%			0.0%	0.0%	0.0%
	<u>e</u>	HACCP	2.0%	0.0%	0.0%	0.0%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	Cecal (Beef)	1	0	0	0	1	0	0	0	0	0	0	0.0%
		Cecal (Dairy)												0.0%
	H	Retail Pork Chops											0.0%	0
	_	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%				0	
	Swine	Cecal (Market Hogs)	0		0	0	0	0	0					0.0%
		Cecal (Sows)												0.0%
		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6. At Least ACT/S <sup>4</sup> Resistant	H	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chic		0	0	1	0	0	0	0	0	0	0	0	0.0%
	<u> </u>	Cecal  Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
	eys:	Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0.0%	0.0%	0
	Turkeys	HACCP	0	0	0	0	0	0	0	0		0	0	0.0%
	<u> </u>	Cecal							0.0%			0.0%	0.0%	0.0%
		Retail Ground Beef	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	HACCP	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.0%
	Ĭ	Cecal (Beef)												0.0%
	<u> </u>	Cecal (Dairy)											0.0%	0.0%
		Retail Pork Chops	0.007		0.004	0.004	0.004	0.004	0.007				0.0%	
	Swine	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%					
	Š	Cecal (Market Hogs)												0.0%
	L	Cecal (Sows)												0.0%
1 Starting in 2011, testing included		entimicrobial classes wi				romycin. Bed	ause resista	ince to azithi	romycin is lo	w (in this cas	se, <1%), ant	timicrobial		

<sup>&</sup>lt;sup>1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

<sup>2</sup> In 2012 and 2013, FSIS did not sample products for Salmonella because in prior years the percent of pork carcass samples positive for Salmonella was consistently low

<sup>3</sup> ACSSUT = ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline

<sup>4</sup> ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole

Table 67c. Resistance Patterns among Salmonella Kentucky Isolates, 2002-2013

Table 67c. Resistance Patte	erns	among Salmonell					•	•				•	1	
Year Number of Isolates Tested		Humans	<b>2002</b> 5	2003	2004	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b> 5	<b>2009</b>	<b>2010</b>	2011 4	2012 7	<b>2013</b>
Number of Isolates Tested	ckens	Retail Chickens HACCP	10 545	20 418	42 570	60 919	59 674	23 443	30 219	44 214	21 243	45 227	62 301	44 237
	Chicke	Cecal												15
	Turkeys	Retail Ground Turkey HACCP Cecal	3 4	4 9	1 6	2 5	1 8	1	0	2	0	2 2	1	2 0 1
	Cattle	Retail Ground Beef HACCP Cecal (Beef)	0 50	0 30	0 25	9	0 14	0 12	1 22	0 10	0 13	3 18	1 12	2 14 6
Resistance Pattern	Swine	Cecal (Dairy)  Retail Pork Chops  HACCP¹  Cecal (Market Hogs)  Cecal (Sows)  Source	0 3	0	0	0 1	0	0 1	0 1	0	0	0	1	15 0 1 3
		Humans	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7. At Least ACSSuTAuCx <sup>1</sup> Resistant	St.	Retail Chickens	0 0.0% 0	0 0.0% 0	0 0.0% 0	0 0.0% 0	0 6.8% 4	0 0.0% 0	0 0.0% 0	0 0.0% 0	0 0.0% 0	0 0.0% 0	0 0.0% 0	0 0.0% 0
	Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
	ؿ	Cecal			-		-					-		0.0%
	_	Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%
	Turkeys	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	
	-	Cecal												0.0%
		Retail Ground Beef							0.0%			0.0%	0.0%	0.0%
	Cattle	HACCP	2.0%	0.0%	0.0%	0.0%	7.1% 1	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	ပိ	Cecal (Beef)												0.0%
		Cecal (Dairy)												0.0%
		Retail Pork Chops											0.0%	
	Swine	HACCP	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%					
	Sw	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0.0% 0
8. At Least Ceftriaxone and		Humans	0.0%	0.0%	0.0%	0.0%	33.3% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nalidixic Acid Resistant	SI	Retail Chickens	0.0%	0.0%	0.0%	1.7% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Chickens	HACCP	0.2%	0.2%	0.0%	0.4%	1.8% 12	1.6% 7	1.8%	1.9%	1.2% 3	0.4%	0.0%	0.0%
	O	Cecal												0.0%
	ş	Retail Ground Turkey	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0		0.0% 0	0.0%	0.0%	0.0%	0.0%
	Turkey	HACCP	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0%		0.0% 0	0.0% 0	
	Ľ	Cecal												0.0%
		Retail Ground Beef							0.0% 0			0.0%	0.0%	0.0%
	Cattle	HACCP	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0						
	Ö	Cecal (Beef)												0.0%
		Cecal (Dairy)												0.0%
		Retail Pork Chops											0.0%	
	Swine	HACCP	0.0%		0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%					
	Š	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0.0% 0

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, FSIS did not sample products for *Salmonella* because in prior years the percent of pork carcass samples positive for *Salmonella* was consistently low <sup>2</sup> ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

#### Campylobacter Data

#### Campylobacter jejuni and Campylobacter coli Isolates Tested

Table 68. Number of Campylobacter jejuni Isolates Tested, 1997-2013<sup>1</sup>

										Year								
	Source									i eai								
	Source	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Humans	209	297	293	306	365	329	303	320	788	709	992	1033	1350	1159	1275	1191	1182
Su	Retail Chickens						198	325	510	403	426	332	329	404	355	393	421	428
Chickens	HACCP					64 <sup>2</sup>	526	374	508	567	228	166	78	117	208	344	1348	788 <sup>3</sup>
_	Cecal																	11
Turkeys	Retail Ground Turkey						2	4	7	10	12	20	10	9	5	13	3	7
Tur	Cecal																	0
Cattle	Cecal (Beef)																	531
Ca	Cecal (Dairy)																	542
vine	Cecal (Market Hogs)																	4
Swi	Cecal (Sows)																	6

Beginning in 2008, ground beef and pork chops were no longer tested for Campylobacter due to low isolation in previous years. Data for these retail meats can be found in prior reports

Table 69. Number of Campylobacter coli Isolates Tested, 1997-2013<sup>1</sup>

Source		Year																
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Humans	6	8	20	12	17	25	22	26	99	97	105	115	142	115	148	134	142
sus	Retail Chickens						90	142	196	151	145	143	181	176	148	210	193	198
Chickens	HACCP					52 <sup>2</sup>	288	247	186	380	123	76	28	81	100	233	693	393 <sup>3</sup>
ch	Cecal																	50
Turkeys	Retail Ground Turkey						2	1	5	9	10	14	19	16	7	18	3	5
Ţ	Cecal																	18
Cattle	Cecal (Beef)																	131
Cat	Cecal (Dairy)																	98
vine	Cecal (Market Hogs)																	190
Sw	Cecal (Sows)																	163

Beginning in 2008, ground beef and pork chops were no longer tested for Campylobacter due to low isolation in previous years. Data for these retail meats can be found in prior reports.

<sup>&</sup>lt;sup>2</sup> These isolates were recovered from July through December, 2001, when the new ARS isolation method was used

 $<sup>^{3}</sup>$  Isolates were susceptibility tested by ARS from Jan-Sept 2013 and by FSIS from Oct-Dec 2013

 $<sup>^2</sup>$  These isolates were recovered from July through December, 2001, when the new ARS isolation method was used

<sup>&</sup>lt;sup>3</sup> Isolates were susceptibility tested by ARS from Jan-Sept 2013 and by FSIS from Oct-Dec 2013

# Isolation of Campylobacter from Retail Meats

Table 70. Number and Percent of Retail Meat Samples Culture Positive for Campylobacter, 2012<sup>1</sup>

Campyiobacter, 2012						
	Retail Chickens	Retail Ground Turkey				
Number of Meat Samples Tested	1300	1295				
Number Positive for Campylobacter	617	7				
Percent Positive for Campylobacter	47.5%	0.5%				

<sup>1</sup> Beginning in 2008, ground beef and pork chops were no longer tested for *Campylobacter* due to low isolation in previous years. Data for these retail meats can be found in prior reports.

Figure 8. Percent of Retail Meat Samples Culture Positive for Campylobacter, 2012

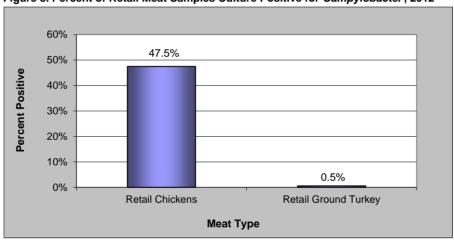
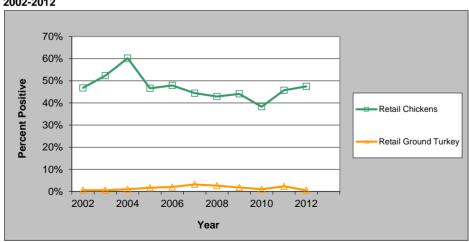


Figure 9. Percent of Retail Meat Samples Culture Positive for *Campylobacter*, 2002-2012



# Isolation of Campylobacter from Retail Meats

Table 71. Number and Percent of Retail Meat Samples Culture Positive for Campylobacter . 2013<sup>1</sup>

Campyiobacter, 2013						
	Retail Chickens	Retail Ground Turkey				
Number of Meat Samples Tested	1669	1644				
Number Positive for Campylobacter	629	12				
Percent Positive for Campylobacter	37.7%	0.7%				

Beginning in 2008, ground beef and pork chops were no longer tested for Campylobacter due to low isolation in previous years. Data for these retail meats can be found in prior reports.

Figure 10. Percent of Retail Meat Samples Culture Positive for Campylobacter, 2013

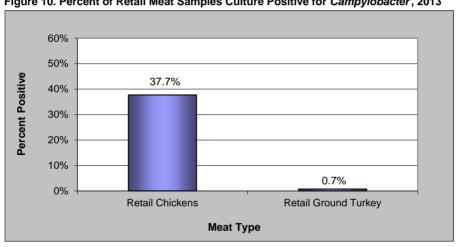
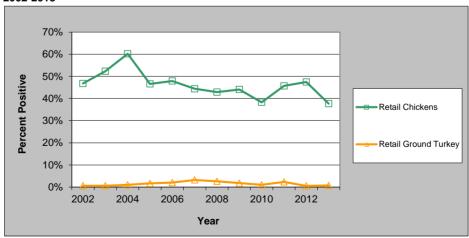


Figure 11. Percent of Retail Meat Samples Culture Positive for Campylobacter, 2002-2013



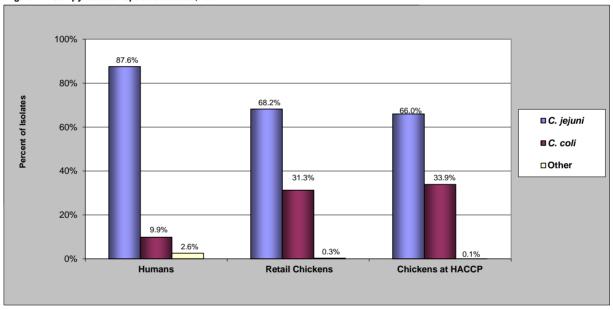
### Campylobacter Species

Table 72. Campylobacter Species Isolated, 2012<sup>1</sup>

Table 12. Campy to bacter operated, 2012								
Campylobacter Species	Humans (N=1360)	Retail Chickens (N=617)	HACCP (N=2042)	Retail Ground Turkey (N=7)				
C. jejuni	87.6%	68.2%	66.0%	42.9%				
0. joja	1191	421	1348	3				
C. coli	9.9%	31.3%	33.9%	42.9%				
0. 0011	134	193	693	3				
Other	2.6%	0.3%	0.05%	14.3%				
Other	35	3	1	1				

<sup>&</sup>lt;sup>1</sup> Beginning in 2008, ground beef and pork chops were no longer tested for *Campylobacter* due to low isolation in previous years. Data for these retail meats can be found in prior reports.

Figure 12. Campylobacter Species Isolated, 2012



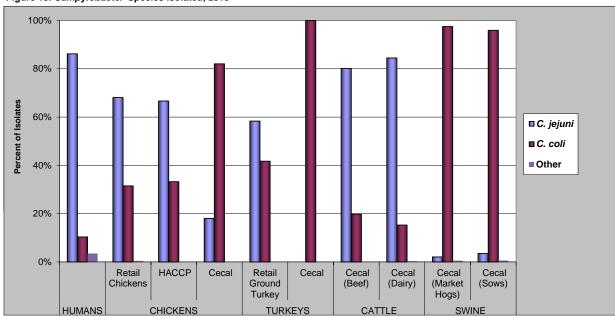
### Campylobacter Species

Table 73. Campylobacter Species Isolated, 20131

	Humans		Chickens		Turi	reys	Cat	tle	Swi	ne
	Humans (N=1372)	Retail Chickens (N= 629)	HACCP <sup>2</sup> (N=1183)	Cecal (N= 61)	Retail Ground Turkey (N= 12)	Cecal (N= 18)	Cecal (Beef) (N= 663)	Cecal (Dairy) (N= 642)	Cecal (Market Hogs) (N= 195)	Cecal (Sows) (N= 170)
Campylobacter Species										
C. jejuni	86.2%	68.0%	66.6%	18.0%	58.3%	0.0%	80.1%	84.4%	2.1%	3.5%
O. jejulii	1182	428	788	11	7	0	531	542	4	6
C. coli	10.3%	31.5%	33.2%	82.0%	41.7%	100.0%	19.8%	15.3%	97.4%	95.9%
O. Con	142	198	393	50	5	18	131	98	190	163
Other	3.5%	0.5%	0.2%	0.0%	0.0%	0.0%	0.2%	0.3%	0.5%	0.6%
Other	48	3	2	0	0	0	1	2	1	1

<sup>&</sup>lt;sup>1</sup> Beginning in 2008, ground beef and pork chops were no longer tested for *Campylobacter* due to low isolation in previous years. Data for these retail meats can be found in prior reports.

Figure 13. Campylobacter Species Isolated, 2013



<sup>&</sup>lt;sup>2</sup> Isolates were susceptibility tested by ARS from Jan-Sept 2013 and by FSIS from Oct-Dec 2013

## Antimicrobial Susceptibility among Campylobacter jejuni

#### **MIC Distributions**

Table 74a. Distribution of MICs and Occurrence of Resistance among Campylobacter jejuni Isolates, 2012

		Isolate Source					-				Distribution		Cs (µg/ml	)4					
Antimicrobial Class	Antimicrobial Agent	(# of Isolates) <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256
Aminoglycosides	Gentamicin	Humans (1191)	1.0	[0.5 - 1.8]				3.0	27.0	57.4	11.4	0.2	0.1			0.3	0.7		
		Retail Chickens (421)  HACCP (1348)	0.2	[0.0 - 1.3]				0.5	8.8	75.1	15.2	0.2					0.2		
		<u>Э</u> HACCP (1348)	0.4	[0.2 - 1.0]				2.2	24.9	63.9	8.5					0.1	0.4		
		ง จั๊ Retail Ground Turkey (3)	0.0	[0.0 - 70.8]					33.3	33.3	33.3								
Ketolides	Telithromycin	Humans (1191)	1.4	[0.8 - 2.3]	0.1			0.3	3.3	19.1	38.8	31.0	6.0	0.3	1.1				
		Retail Chickens (421)  HACCP (1348)	0.7	[0.1 - 2.1]			0.2	1.4	21.9	43.9	26.8	4.3	0.7	0.2	0.5				
		인 HACCP (1348)	0.5	[0.2 - 1.1]		0.1	0.1	1.3	19.7	50.1	23.1	4.5	0.4	0.2	0.3				
		왕 왕 Retail Ground Turkey (3)	0.0	[0.0 - 70.8]						33.3	66.7								
Lincosamides	Clindamycin	Humans (1191)	10.8	[9.1 - 12.7]		0.7	8.9	30.1	23.3	26.2	8.4	0.8	0.2	0.3	0.3	0.8			
		ହ କୁ Retail Chickens (421)	1.2	[0.4 - 2.7]		3.8	29.0	47.7	15.9	2.4			0.5	0.2		0.5			
		Retail Chickens (421)  HACCP (1348)	1.0	[0.6 - 1.7]		1.2	21.9	55.9	17.7	2.3	0.4	0.1	0.1	0.2	0.1				
		Retail Ground Turkey (3)	0.0	[0.0 - 70.8]				100.0											
Macrolides	Azithromycin	Humans (1191)	1.8	[1.1 - 2.7]	0.7	9.6	32.8	34.3	20.9	0.3	0.1						0.3	1.2	
		Retail Chickens (421)	1.2	[0.4 - 2.7]	12.1	48.9	31.1	6.7			0.5							0.7	
		인 HACCP (1348)	1.0	[0.6 - 1.7]	6.8	63.5	27.0	1.4	0.2								0.1	1.0	
		용한 유etail Ground Turkey (3)	0.0	[0.0 - 70.8]			100.0												
	Erythromycin	Humans (1191)	1.5	[0.9 - 2.4]		0.1		1.6	19.5	26.1	35.3	14.4	1.5	0.1			0.3	1.2	
		ହ କୁ Retail Chickens (421)	0.7	[0.1 - 2.1]		0.2	0.2	15.7	47.5	24.9	10.0	0.5	0.2					0.7	
		Retail Chickens (421)  HACCP (1348)	1.1	[0.6 - 1.8]		0.1	0.2	10.0	49.9	30.0	8.2	0.4	0.1			0.1	0.1	0.8	
		양한 Retail Ground Turkey (3)	0.0	[0.0 - 70.8]					66.7	33.3									

<sup>&</sup>lt;sup>1</sup> Beginning in 2008, ground beef and pork chops were no longer tested for Campylobacter due to low isolation in previous years. Data for these retail meats can be found in prior reports.

<sup>&</sup>lt;sup>2</sup> Percent resistant; Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

Table 74b. Distribution of MICs and Occurrence of Resistance among Campylobacter jejuni Isolates, 2012

		Isolate Source		umong ou							Distributio	n (%) of MI	Cs (µg/ml	)4					
Antimicrobial Class	Antimicrobial Agent	(# of Isolates) 1	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256
Phenicols	Florfenicol	Humans (1191)	1.4	[0.8 - 2.3]						2.9	53.7	34.4	7.5	1.0	0.3			0.2	
		Retail Chickens (421)  HACCP (1348)	0.0	[0.0 - 0.9]			0.5		0.7	31.1	60.1	7.4	0.2						
		등 HACCP (1348)	0.0	[0.0 - 0.3]				0.1	0.3	32.8	63.6	3.0	0.2						
		ο κ	0.0	[0.0 - 70.8]						66.7	33.3								
Quinolones	Ciprofloxacin	Humans (1191)	25.3	[22.8 - 27.8]	0.2	0.6	22.8	42.1	8.2	0.8	0.3	0.1	1.7	9.1	8.1	3.4	1.6	1.1	
		Retail Chickens (421)	16.4	[13.0 - 20.3]		1.2	24.9	44.9	12.6				0.7	7.4	4.5	3.8			
		등 HACCP (1348)	22.6	[20.4 - 25.0]	0.1	1.6	41.7	30.8	3.1	0.1		0.1	1.7	13.1	6.9	0.7			
		Retail Ground Turkey (3)	33.3	[0.8 - 90.6]			33.3	33.3					33.3						
	Nalidixic acid	Humans (1191)	25.5	[23.1 - 28.1]									56.7	16.6	1.2		2.0	23.5	
		Retail Chickens (421)	16.4	[13.0 - 20.3]									48.0	34.4	1.2		5.2	11.2	
		.일 HACCP (1348)	22.8	[20.6 - 25.1]									60.8	16.2	0.2	0.7	3.9	18.2	
		& Retail Ground Turkey (3)	33.3	[0.8 - 90.6]									66.7					33.3	
Tetracyclines	Tetracycline	Humans (1191)	47.8	[44.9 - 50.7]			1.3	14.9	21.7	11.1	3.2	1.9	0.5		0.3	1.2	6.0	37.9	
		Retail Chickens (421)	49.6	[44.8 - 54.5]			3.3	19.0	18.1	6.4	3.6		0.2		1.9	9.3	17.1	21.1	
		을 HACCP (1348)	50.7	[48.0 - 53.4]			1.6	24.3	15.8	5.1	2.5	0.1	0.3	0.1	1.8	5.9	21.7	20.8	
		Retail Ground Turkey (3)	100.0	[29.2 - 100.0]													66.7	33.3	

<sup>1</sup> Beginning in 2008, ground beef and pork chops were no longer tested for Campylobacter due to low isolation in previous years. Data for these retail meats can be found in prior reports.

<sup>&</sup>lt;sup>2</sup> Percent resistant; Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations.

### Antimicrobial Susceptibility among Campylobacter jejuni

#### **MIC Distributions**

Table 75a. Distribution of MICs and Occurrence of Resistance among Campylobacter jejuni Isolates, 2013

		Isolate Source		<u> </u>	,,,		,,,		,		Distributio	n (%) of Mi	Cs (µg/ml)	4					
Antimicrobial Class	Antimicrobial Agent	(# of Isolates) <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256
Aminoglycosides	Gentamicin	Humans (1182)	1.6	[1.0 - 2.5]					0.1	45.8	51.9	0.6		0.1		0.1	1.4		
		Retail Chickens (428) HACCP (788) <sup>5</sup>	0.5	[0.1 - 1.7]				0.2	15.4	69.9	14.0						0.5		
			0.4 0.0	[0.1 - 1.1] [0.0 - 28.5]				4.7	38.1 27.3	55.6 72.7	1.3					0.1	0.3		
			_					440			00.57								
		왕 Retail Ground Turkey (7) 근 Cecal (0)	0.0	[0.0 - 41.0]				14.3	28.57	28.57	28.57								
			0.0	[0.0 - 100.0]															
		© Cecal (Beef) (531)	0.0	[0.0 - 0.7]				0.4	3.6	59.3	36.5	0.2							
		Cecal (Dairy) (542)	0.0	[0.0 - 0.7]				0.4	7.0	63.5	29.2								
		Cecal (Market Hogs) (4)	0.0	[0.0 - 60.2]						100.0									
		Cecal (Sows) (6)	0.0	[0.0 - 45.9]					16.7		66.7	16.7							
Ketolides	Telithromycin	Humans (1182)	2.0	[1.3 - 3.0]					3.6	22.4	41.7	27.8	2.4	0.3	1.8				
		ୁଞ୍ଚ Retail Chickens (428)	0.9	[0.3 - 2.4]				1.6	19.2	46.7	25.5	5.1	0.9	0.9					
		은 Retail Chickens (428) 는 HACCP (788) <sup>5</sup> O Cecal (11)	1.9 0.0	[1.1 - 3.1] [0.0 - 28.5]		0.1	0.3	4.1 9.1	25.8	44.9	19.7	2.7	0.6	1.1	8.0				
		` ′	_	[0.0 - 28.5]				5.1	54.6 14.3	27.3 28.6	9.1 42.9	14.3							
		Retail Ground Turkey (7)  Cecal (0)	0.0	[0.0 - 41.0]					14.5	20.0	42.5	14.5							
		⊕ Cecal (Beef) (531)	0.2	[0.0 - 1.0]				0.4	5.1	44.3	40.5	9.0	0.6		0.2				
		Cecal (Dairy) (542)	0.7	[0.2 - 1.9]				0.2	7.0	45.4	38.8	7.8	0.2	0.6	0.2				
		© Cecal (Market Hogs) (4)	0.0	[0.0 - 60.2]						25.0	50.0		25.0						
		Cecal (Sows) (6)	33.3	[4.3 - 77.7]						50.0	-	16.7			33.3				
Lincosamides	Clindamycin	Humans (1182)	3.2	[2.3 - 4.4]		0.1	5.7	54.0	29.9	7.2	1.0	0.3	0.1	0.9	0.5	0.4			
		Retail Chickens (428)  HACCP (788) <sup>5</sup>	1.2	[0.4 - 2.7]		1.4	25.0	48.4	20.6	3.5		0.5	0.7						
		호 HACCP (788)⁵ 5 Cecal (11)	2.4 0.0	[1.5 - 3.7] [0.0 - 28.5]		4.8	34.4 63.6	47.5 36.4	9.3	1.6	0.3	0.5	1.4	0.3					
		Retail Ground Turkey (7)	0.0	[0.0 - 41.0]			28.6	57.1	14.3										
		는 Cecal (0)	0.0	[0.0 - 100.0]															
		⊕ Cecal (Beef) (531)	1.3	[0.5 - 2.7]		0.9	19.2	43.1	28.8	6.6	1.1	0.2							
		Cecal (Dairy) (542)	1.3	[0.5 - 2.6]		1.1	23.4	42.4	26.0	5.7	0.9	0.2				0.4			
			0.0				25.0	75.0											
		Cecal (Market Hogs) (4) Cecal (Sows) (6)	33.3	[0.0 - 60.2] [4.3 - 77.7]			16.7	75.0	50.0					16.7	16.7				
						40.5		24.0		I				10.7	10.7				
Macrolides	Azithromycin	Humans (1182)	2.2	[1.4 - 3.2]		12.5	45.4	34.3	5.6								0.1	2.1	
		Retail Chickens (428)  HACCP (788) <sup>5</sup> Cecal (11)	1.6 2.3	[0.7 - 3.3] [1.4 - 3.6]	9.1 16.6	56.5 54.3	30.4 24.6	2.1 2.2	0.2			0.2					0.2	1.2 2.3	
		Ö Cecal (11)	0.0	[0.0 - 28.5]	9.1	81.8	9.1												
		Retail Ground Turkey (7)	0.0	[0.0 - 41.0]		57.1	42.9												
		Retail Ground Turkey (7)  Cecal (0)	0.0	[0.0 - 100.0]															
		<u>Ф</u> Cecal (Beef) (531)	0.0	[0.0 - 0.7]	6.4	46.3	42.0	5.3											
		© Cecal (Beef) (531) Cecal (Dairy) (542)	0.4	[0.0 - 1.3]	7.6	49.8	36.7	5.4	0.2									0.4	
		⊕ Cecal (Market Hogs) (4)	0.0	[0.0 - 60.2]		25.0	50.0	25.0											
		Cecal (Sows) (6)	33.3	[4.3 - 77.7]	16.7	16.7	33.3											33.3	
	Erythromycin	Humans (1182)	2.2	[1.4 - 3.2]				0.4	21.2	42.6	29.9	3.4	0.3			0.2	0.1	1.9	
		Retail Chickens (428)	1.6	[0.7 - 3.3]			0.5	11.9	47.0	28.7	9.1	1.2			0.2		0.2	1.2	
		Retail Chickens (428)  HACCP (788) <sup>5</sup> Cecal (11)	2.3	[1.4 - 3.6]		0.1	0.4	14.0	50.1	27.7	5.5						0.3	2.0	
			- 0.0	[0.0 - 28.5]				18.2	72.7	9.1	20.6								
		Retail Ground Turkey (7)	0.0	[0.0 - 41.0]					28.6	42.9	28.6								
			0.0	[0.0 - 100.0]															
		© Cecal (Beef) (531)	0.0	[0.0 - 0.7]			0.2		0.2	38.6	57.8	2.5	8.0						
		G Cecal (Dairy) (542)	0.4	[0.0 - 1.3] [0.0 - 100.0]			0.4	5.4	54.8	32.5	6.1	0.6						0.4	
		© Cecal (Market Hogs) (4)	0.0	[0.0 - 60.2]					25.0	50.0	25.0								
		Cecal (Market Hogs) (4) Cecal (Sows) (6)	33.3	[4.3 - 77.7]					33.3	16.7		16.7						33.3	

Beginning in 2008, ground beef and pork chops were no longer tested for *Campylobacter* due to low isolation in previous years. Data for these retail meats can be found in prior reports.

Percent resistant; Discrepancies between %R and sums of distribution %s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup>The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

 $<sup>^{\</sup>rm 5}$  Isolates were susceptibility tested by ARS from Jan-Sept 2013 and by FSIS from Oct-Dec 2013

Table 75b. Distribution of MICs and Occurrence of Resistance among Campylobacter jejuni Isolates, 2013

. a.z.c . obi bioti		Isolate Source		umong	-ampy		jojain	.50.0.00	., 20.0		Distribution	n (%) of MI	Cs (µa/ml)	4					
Antimicrobial Class	Antimicrobial Agent	(# of Isolates) 1	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4 4	8	16	32	64	128	256
Phenicols	Florfenicol	Humans (1182)	1.2	[0.6 - 2.0]						1.4	76.1	19.5	1.9	1.0	0.2				
		Retail Chickens (428)	0.0	[0.0 - 0.9]				0.2	0.5	33.6	60.8	4.7	0.2						
		호 HACCP (788) <sup>5</sup> C Cecal (11)	0.0 0.0	[0.0 - 0.5] [0.0 - 28.5]					8.0	41.5 54.6	54.9 45.5	2.5	0.3						
		Retail Ground Turkey (7)	0.0	[0.0 - 41.0]						42.9	57.1								
		E Cecal (0)	0.0	[0.0 - 100.0]						42.5	37.1								
		⊕ Cecal (Beef) (531)	0.0	[0.0 - 0.7]			0.2		0.2	38.6	57.8	2.5	0.8						
		Cecal (Dairy) (542)	0.0	[0.0 - 0.7]					0.2	37.3	59.4	2.8	0.4						
		© Cecal (Market Hogs) (4)	0.0	[0.0 - 60.2]						50.0	50.0								
		Cecal (Sows) (6)	0.0	[0.0 - 45.9]						16.7	83.3								
Quinolones	Ciprofloxacin	Humans (1182)	22.3	[19.9 - 24.7]		0.3	19.7	47.0	9.5	1.2	0.1		0.1	8.5	8.1	3.0	1.8	0.6	
		Retail Chickens (428)	11.2	[8.4 - 14.6]		0.5	16.8	60.1	11.5					4.2	4.7	2.1	0.2		
		Retail Chickens (428)  HACCP (788) <sup>5</sup> Cecal (11)	24.2 36.4	[21.3 - 27.4] [10.9 - 69.2]	0.1	1.1	38.2 27.3	32.7 36.4	3.6			0.1	1.6	15.1 27.3	7.2 9.1	0.1			
		, ,	14.3	[0.4 - 57.9]			21.5	85.7						14.3	3.1				
		Retail Ground Turkey (7)	0.0	[0.0 - 100.0]				00.7						14.5					
			13.7	[10.9 - 17.0]		1.1	27.3	50.9	6.8	0.2			0.6	7.3	5.5	0.4			
		© Cecal (Beef) (531)  Cecal (Dairy) (542)	8.5	[6.3 - 11.2]		1.5	41.9	43.2	4.8	0.2	0.2		0.7	5.9	1.3	0.4			
		, , , , , , , , , , , , , , , , , , , ,	25.0	[0.6 - 80.6]			25.0	50.0			0.2		•	25.0					
		© Cecal (Market Hogs) (4)	0.0	[0.0 - 45.9]			25.0	50.0	50.0					25.0					
	Nalidixic acid	Humans (1182)	22.2	[19.8 - 24.6]									63.1	13.9	0.8		0.3	21.9	
		Retail Chickens (428)	11.2	[8.4 - 14.6]									55.4	33.2	0.2	0.2	1.9	9.1	
		Retail Chickens (428)  HACCP (788) <sup>5</sup> Cecal (11)	24.4 36.4	[21.4 - 27.5] [10.9 - 69.2]									64.1 63.6	11.3	0.3	1.3	6.7 9.1	16.4 27.3	
			14.3	[0.4 - 57.9]									71.4	14.3		14.3	3.1	21.3	
		Retail Ground Turkey (7)	0.0	[0.0 - 100.0]									71.4	14.5		14.5			
			13.7	[10.9 - 17.0]									56.9	28.8	0.6	0.2	2.3	11.3	
		© Cecal (Beef) (531) Cecal (Dairy) (542)	8.5	[6.3 - 11.2]									67.0	23.8	0.7	0.4	2.0	6.1	
			25.0	[0.6 - 80.6]									50.0	25.0				25.0	
		© Cecal (Market Hogs) (4)  Cecal (Sows) (6)	0.0	[0.0 - 45.9]										100.0				20.0	
Tetracyclines	Tetracycline	Humans (1182)	49.1	[46.2 - 52.0]			1.4	23.9	20.1	4.1	1.4	0.7	0.1		0.3	0.7	5.3	42.0	
		ୁଞ୍ଚ Retail Chickens (428)	48.4	[43.5 - 53.2]			2.1	22.0	18.5	6.1	3.0		0.2	0.2	3.5	5.1	20.3	18.9	
		Retail Chickens (428)  HACCP (788) <sup>5</sup> Cecal (11)	59.9 45.5	[56.4 - 63.3] [16.7 - 76.6]			2.0	23.1 45.5	11.5 9.1	2.5	0.9	0.6	0.3	0.5	2.8	9.8 18.2	27.3 18.2	18.7 9.1	
		` .	42.9	[9.9 - 81.6]				42.9	14.3								28.6	14.3	
		Retail Ground Turkey (7) Cecal (0)	0.0	[0.0 - 100.0]															
		© Cecal (Beef) (531)	68.0	[63.8 - 71.9]			1.3	18.8	9.2	2.1	0.6			0.4	1.9	8.3	20.5	36.9	
		© Cecal (Beef) (531) Cecal (Dairy) (542)	62.0	[57.8 - 66.1]			2.0	19.5	13.3	2.8	0.4	0.2			2.4	9.4	19.6	30.4	
		© Cecal (Market Hogs) (4)	100.0	[39.8 - 100.0]													25.0	75.0	
		Cecal (Sows) (6)	66.7	[22.3 - 95.7]					16.7	16.7					33.3		16.7	16.7	

<sup>&</sup>lt;sup>1</sup>Beginning in 2008, ground beef and pork chops were no longer tested for *Campylobacter* due to low isolation in previous years. Data for these retail meats can be found in prior reports. <sup>2</sup> Percent resistant; Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup>The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

 $<sup>^{\</sup>rm 5}$  Isolates were susceptibility tested by ARS from Jan-Sept 2013 and by FSIS from Oct-Dec 2013

## Resistance by Year

Table 76a. Antimicr Year			,,	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	sted		Humans	329	303	320	788	709	992	1033	1350	1159	1275	1191	1182
		Chickens	Retail Chickens	198	325	510	403	426	332	329	404	355	393	421	428
		Chick	HACCP	526	374	508	567	228	166	78	117	208	344	1348	788
			Cecal												11
		Turkeys	Retail Ground Turkey	2	4	7	10	12	20	10	9	5	13	3	7
			Cecal (Beef)												0
		Cattle	Cecal (Dairy)												531 542
		Je	Cecal (Market Hogs)												4
		Swine	Cecal (Sows)												6
	Antimicrobial (Resistance														
Antimicrobial Class	Breakpoint) 1		Isolate Source <sup>2</sup>	0.00/	2 22/	2.00/	2 42/	2.00/	2.00/	4.407	0.00/	0.00/	4.00/	4.00/	1.00/
Aminoglycosides	Gentamicin (MIC > 2 μg/ml)		Humans	0.0%	0.0% 0	2.2% 7	0.1% 1	0.0%	0.8% 8	1.1% 11	0.6% 8	0.6% 7	1.0% 13	1.0% 12	1.6% 19
	, ,		Retail Chickens	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.5%
		kens	LIACOR	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0 1.3%	0.9%	0 0.5%	0.3%	0.4%	0.4%
		Chickens	HACCP	0	0	1	0	0	0	1	1	1	1	6	3
			Cecal												0.0%
		S/	Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys	,	0	0	0	0	0	0	0	0	0	0	0	0
		Ē	Cecal												
		<u>e</u>	Cecal (Beef)												0.0%
		Cattle	Cecal (Dairy)												0.0%
															0.0%
		Swine	Cecal (Market Hogs)												0.078
		Š	Cecal (Sows)												0.0% 0
Ketolides	Telithromycin		Humans				0.8%	1.0%	1.3%	2.2%	1.9%	2.4%	2.6%	1.4%	2.0%
	(MIC > 4 µg/ml)		1			0.8%	6 0.5%	7 0.9%	13 0.6%	23 1.2%	25 0.7%	28 0.9%	33 0.5%	17 0.7%	24 0.9%
		SL	Retail Chickens			4	2	4	2	4	3	3	2	3	4
		Chickens	HACCP				0.9%	0.4%	0.0%	0.0% 0	0.0% 0	0.0%	0.6% 2	0.5% 7	1.9%
			Cecal				5	1	0	U	0	0	2	,	15 0.0%
			Occai			0.00/	0.00/	0.00/	F 00/	40.00/	0.00/	0.007	0.00/	0.00/	0
		Turkeys	Retail Ground Turkey			0.0% 0	0.0% 0	0.0% 0	5.0% 1	10.0% 1	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
		Tut	Cecal												
			Cecal (Beef)												0.2%
		Cattle	Cecai (Beei)												1
		0	Cecal (Dairy)												0.7% 4
		ө	Cecal (Market Hogs)												0.0%
		Swine	Cecal (Sows)												33.3%
			Cecai (Sows)												2
Lincosamides	Clindamycin (MIC > 0.5 µg/ml)		Humans	4.3% 14	4.3% 13	5.6% 18	3.2% 25	2.4% 17	3.5% 35	3.8% 39	2.9% 39	14.1% 163	21.5% 274	10.8% 129	3.2% 38
	(		Retail Chickens			2.2%	1.2%	0.7%	0.6%	1.8%	1.5%	0.6%	1.0%	1.2%	1.2%
		ens		2.9%	2.7%	11 1.8%	5 1.1%	3 0.4%	0.0%	6 1.3%	6 0.0%	2 0.0%	4 1.2%	5 1.0%	5 2.4%
		Chickens	HACCP	15	10	9	6	1	0	1	0	0	4	14	19
			Cecal												0.0% 0
		õ	Retail Ground Turkey			14.3%	0.0%	0.0%	5.0%	10.0%	11.1%	0.0%	0.0%	0.0%	0.0%
		Turkeys	,			1	0	0	1	1	1	0	0	0	0
		ĭ	Cecal												
		<u>e</u>	Cecal (Beef)												1.3% 7
		Cattle	Cecal (Dairy)												1.3%
			, ,,												7
		Swine	Cecal (Market Hogs)												0.0%
		Sw	Cecal (Sows)												33.3%
1		Щ.	I thromycin, erythromycin,												2

<sup>&</sup>lt;sup>1</sup> Percent resistance for gentamicin, clindamycin, azithromycin, erythromycin, nalidixic acid, and doxycycline in this report may differ from previously published percentages because breakpoints have been revised for these antimicrobials

<sup>&</sup>lt;sup>2</sup> Beginning in 2008, retail ground beef and retail pork chops were no longer tested for *Campylobacter* due to low isolation in previous years. Data for these retail meats can be found in prior reports. 150

Table 76b. Antimicr	obial Resistance	amo	ong Campylobacter					2006	2007	2000	2000	2040	2011	2042	2012
Year Number of Isolates Tester	d		Humans	<b>2002</b> 329	<b>2003</b> 303	<b>2004</b> 320	<b>2005</b> 788	<b>2006</b> 709	<b>2007</b> 992	<b>2008</b> 1033	<b>2009</b> 1350	<b>2010</b> 1159	<b>2011</b> 1275	<b>2012</b> 1191	<b>2013</b> 1182
		sens	Retail Chickens	198	325	510	403	426	332	329	404	355	393	421	428
		Chickens	HACCP	526	374	508	567	228	166	78	117	208	344	1348	788
			Cecal Retail Ground Turkey	2	4	7	10	12	20	10	9	5	13	3	11 7
		Turkeys	Cecal	2	4	,	10	12	20	10	9	5	13	3	0
		Cattle	Cecal (Beef) Cecal (Dairy)												531 542
		Swine	Cecal (Market Hogs)												4
	Antimicrobial	Ó	Cecal (Sows)												6
Antimicrobial Class	(Resistance Breakpoint) <sup>1</sup>		Isolate Source <sup>2</sup>												
Macrolides	Azithromycin (MIC > 0.25 μg/ml)		Humans	2.1% 7	1.3% 4	9.4% 30	2.7% 21	1.3% 9	1.8% 18	2.6% 27	1.9% 26	2.7% 31	4.9% 63	1.8% 21	2.2% 26
	, , ,	S	Retail Chickens			1.8% 9	5.0% 2	0.9% 4	0.6% 2	1.2% 4	1.0% 4	0.6% 2	0.5% 2	1.2% 5	1.6% 7
		Chickens	HACCP	2.7% 14	1.6% 6	1.8% 9	1.8% 10	1.3% 3	0.6% 1	1.3% 1	0.0% 0	0.0%	0.9% 3	1.0% 14	2.3% 18
		ပ်	Cecal	14	0	9	10	3	,	1	0	0	3	14	0.0%
		sk	Retail Ground Turkey			0.0%	0.0%	0.0%	5.0%	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys	Cecal			0	0	0	1	1	0	0	0	0	0
		<u>e</u>	Cecal (Beef)												0.0%
		Cattle	Cecal (Dairy)												0.4%
		ne	Cecal (Market Hogs)												0.0%
		Swine	Cecal (Sows)												33.3%
	Erythromycin (MIC > 4 µg/ml)		Humans	1.8% 6	0.3% 1	0.9%	1.5% 12	0.8% 6	1.6% 16	2.2% 23	1.5% 20	1.2% 14	1.8% 23	1.5% 18	2.2% 26
	(	s	Retail Chickens	0.0%	0.0%	0.8%	0.5%	0.9%	0.6%	1.2%	1.0%	0.6%	0.6%	0.7%	1.6%
		Chickens	HACCP	0.6%	1.6%	1.6% 8	1.1% 6	0.4% 1	0.0%	1.3% 1	0.0%	0.0% 0	0.6% 2	1.1% 15	2.3% 18
		O	Cecal												0.0% 0
		Turkeys	Retail Ground Turkey	0.0% 0	0.0%	0.0%	0.0%	0.0% 0	5.0% 1	10.0% 1	0.0% 0	0.0% 0	0.0%	0.0%	0.0% 0
		Turk	Cecal												
		Cattle	Cecal (Beef)												0.0% 0
		Ca	Cecal (Dairy)												0.4% 2
		Swine	Cecal (Market Hogs)												0.0% 0
		Š	Cecal (Sows)												33.3% 2
Phenicols	Florfenicol (MIC > 4) 3,4		Humans				0.4% 3	0.0% 0	0.0%	0.6% 6	0.6% 8	1.5% 17	2.1% 27	1.4% 17	1.2% 14
		Š	Retail Chickens			0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Chickens	HACCP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		O	Cecal												0.0%
		Turkeys	Retail Ground Turkey			0.0%	0.0%	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0%	0.0%	0.0% 0
		Turk	Cecal												
		Cattle	Cecal (Beef)												0.0% 0
		Ca	Cecal (Dairy)												0.0% 0
		Swine	Cecal (Market Hogs)												0.0% 0
			Cecal (Sows)												0.0% 0
Resistance figures for g	entamicin, clindamycir	n, azi	thromycin, erythromycin,	nalidixic a	cid, and do	xycycline ir	this report	may differ	from previ	ously publis	hed figures	s because b	reakpoints	have been	revised for

Resistance figures for gentamicin, clindamycin, azithromycin, erythromycin, nalidixic acid, and doxycycline in this report may differ from previously published figures because breakpoints have been revised for these antimicrobials

Beginning in 2008, ground beef and pork chops were no longer tested for *Campylobacter* due to low isolation in previous years. Data for these retail meats can be found in prior reports.

<sup>&</sup>lt;sup>3</sup> For Humans and Chickens at HACCP, results prior to 2005 are for Chloramphenicol

Table 76c. Antimicrobial Resistance among Campylobacter jejuni Isolates, 2002-2013

Table 76c. Antimicro	obiai Resistance	amc	ong Campylobacter	2002	2003	2002-201	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested			Humans	Humans         329           tail Chickens         198           CCP         526           cal         tail Ground Turkey         2			788	709	992	1033	1350	1159	1275	1191	1182
		sus	Retail Chickens	198	325	510	403	426	332	329	404	355	393	421	428
		Chickens	HACCP		374	508	567	228	166	78	117	208	344	1348	788
			Cecal												11
		eys	Retail Ground Turkey	2	4	7	10	12	20	10	9	5	13	3	7
		Turkeys	Cecal	_	·	,					Ů	ŭ	.0	Ů	0
			Cecal (Beef)												531
		Cattle	Cecal (Dairy)												542
		Swine	Cecal (Market Hogs)												4
	A	Ś	Cecal (Sows)												6
	Antimicrobial (Resistance														
Antimicrobial Class	Breakpoint) 1		Isolate Source <sup>2</sup>												
Quinolones	Ciprofloxacin (MIC > 0.5 µg/ml)		Humans	21.3% 70	17.5% 53	18.1% 58	21.6% 170	19.6% 139	26.0% 258	22.6% 233	23.1% 312	22.0% 255	24.1% 307	25.3% 301	22.3% 263
	(		Retail Chickens	17.2%	14.8%	15.1%	16.7%	17.2%	14.6%	21.3%	22.5%	22.7%	16.4%	16.4%	11.2%
		cens	114000	34 18.8%	48 14.7%	77 21.5%	61 15.0%	71 9.6%	57 22.3%	48 32.1%	86 19.7%	80 23.1%	89 19.5%	69 22.6%	48 24.2%
		Chickens	HACCP	99	55	109	85	22	37	25	23	48	67	305	191
			Cecal												36.4% 4
		sys	Retail Ground Turkey	50.0% 1	0.0% 0	28.6% 2	10.0%	50.0% 6	30.0% 6	60.0% 6	44.4% 4	40.0% 2	46.2% 6	33.3% 1	14.3%
		Turkeys	Cecal	·	0		1	0	0	0	4	2	0	ı	1
		_													13.8%
		Cattle	Cecal (Beef)												73
		ပ်	Cecal (Dairy)												8.5% 46
		d)	Cecal (Market Hogs)												25.0%
		Swine	· · · · · · · · · · · · · · · · · · ·												0.0%
		0)	Cecal (Sows)												0
	Nalidixic acid (MIC ≥ 16 µg/ml)		Humans	21.3% 70	17.8% 54	19.1% 61	22.5% 177	19.5% 138	26.5% 263	22.8% 236	23.1% 312	22.1% 256	24.1% 307	25.5% 304	22.2% 262
	(		Retail Chickens			15.3%	15.1%	16.7%	.171.	14.6%	21.3%	22.8%	21.6%	16.4%	11.2%
		Chickens	HACCP	22.8%	15.5%	78 21.7%	61 16.9%	71 8.8%	57 22.3%	48 33.3%	86 19.7%	81 23.1%	85 20.3%	69 22.8%	48 24.4%
		Chic	ПАССР	120	58	110	96	20	37	26	23	48	70	307	192 36.4%
			Cecal												4
		sys	Retail Ground Turkey			28.6% 2	10.0% 1	50.0% 6	30.0% 6	60.0% 6	44.4% 4	40.0% 2	46.2% 6	33.3% 1	14.3% 1
		Turkeys	Cecal						Ü	Ü	7		J	,	
															13.7%
		Cattle	Cecal (Beef)												73
		ű	Cecal (Dairy)												8.5% 46
		Ф	Cecal (Market Hogs)												25.0%
		Swine	Cecal (Sows)												0.0%
Totropyolin	Totropyoli3	ļ.,	, ,	40.00/	40.00/	47.50/	40.70/	40.70/	4E 70/	45.00/	44.407	44.00/	40.00/	47.00/	0
Tetracyclines	Tetracycline <sup>3</sup> (MIC > 1 µg/ml)		Humans	43.2% 142	40.9% 124	47.5% 152	43.7% 344	48.7% 345	45.7% 453	45.3% 468	44.1% 595	44.2% 512	48.3% 616	47.8% 569	49.1% 580
		(0	Retail Chickens	58.1%	50.2%	50.4% 257	46.9% 189	48.4% 206	48.8% 162	50.5% 166	46.7% 188	36.3% 129	50.1% 197	49.6% 209	48.4% 207
		Chickens	HACCP	115 50.0%	163 50.3%	43.5%	44.8%	58.3%	57.8%	55.1%	51.3%	49.5%	45.9%	50.7%	59.9%
		Chic		263	188	221	254	133	96	43	60	103	158	684	472 45.5%
			Cecal												5
		eys	Retail Ground Turkey	100.0% 2	75.0% 3	42.9% 3	70.0% 7	75.0% 9	90.0% 18	100.0% 10	100.0% 9	80.0% 4	92.3% 12	100.0% 3	42.9% 3
		Turkeys	Cecal												
		-													68.0%
		Cattle	Cecal (Beef)												361
		Ö	Cecal (Dairy)												62.0% 336
		e	Cecal (Market Hogs)												100.0%
		Swine	Cecal (Sows)												4 66.7%
		3,	Cecai (Sows)												4

Resistance figures for gentamicin, clindamycin, azithromycin, erythromycin, nalidixic acid, and doxycycline in this report may differ from previously published figures because breakpoints have been revised for these antimicrobials

<sup>&</sup>lt;sup>2</sup> Beginning in 2008, ground beef and pork chops were no longer tested for Campylobacter due to low isolation in previous years. Data for these retail meats can be found in prior reports.

<sup>&</sup>lt;sup>3</sup> For Retail Chickens and Retail Ground Turkey, results for 2002 and 2003 are for Doxycycline

## Antimicrobial Susceptibility among Campylobacter coli

#### **MIC Distributions**

Table 77a. Distribution of MICs and Occurrence of Resistance among Campylobacter coli Isolates, 2012

1 2 3 1 1 2 1 3 1 3 1 3 1 3 1 3 1 3 1 3		Isolate Source			- <sub>1</sub> -y	2.0. 30		,	_	[	Distribution	1 (%) of MI	Cs (µg/ml)	4					
Antimicrobial Class	Antimicrobial Agent	(# of Isolates) <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256
Aminoglycosides	Gentamicin	Humans (134)	6.0	[2.6 - 11.4]					25.4	38.1	29.1	1.5				1.5	4.5		
		Retail Chickens (193)	4.1	[1.8 - 8.0]					1.6	73.6	19.7	1.0					4.2		
		Retail Chickens (193)	3.9	[2.6 - 5.6]					10.1	70.9	15.0	0.1					3.9		
		ທຸ້ວ ອຸຊຸ Retail Ground Turkey (3)	0.0	[0.0 - 70.8]						66.67	33.33								
Ketolides	Telithromycin	Humans (134)	11.2	[6.4 - 17.8]			0.7	1.5	12.7	25.4	4.5	17.2	26.9	4.5	6.7				
		Retail Chickens (193)	14.0	[9.4 - 19.7]				1.0	14.5	2.1	23.8	35.2	9.3	2.1	11.9				
		Retail Chickens (193)	7.1	[5.3 - 9.2]			0.3	3.5	17.6	9.2	31.0	26.3	5.1	1.9	5.2				
		ος Ψ Σ Ε Retail Ground Turkey (3)	0.0	[0.0 - 70.8]								100.0							
Lincosamides	Clindamycin	Humans (134)	16.4	[10.6 - 23.8]			0.7	6.7	34.3	24.6	17.2	6.7	0.7	0.7	5.2	3.0			
		Retail Chickens (193)	12.4	[8.1 - 17.9]			1.0	19.7	52.3	10.9	3.6	1.6	8.8	1.0		1.0			
		Retail Chickens (193)	8.5	[6.5 - 10.8]			2.2	32.6	47.8	7.6	1.3	1.9	3.6	2.2	0.1	0.7			
		Retail Ground Turkey (3)	0.0	[0.0 - 70.8]					33.3	33.3	33.3								
Macrolides	Azithromycin	Humans (134)	9.0	[4.7 - 15.1]		1.5	16.4	36.6	25.4	11.2							1.5	7.5	
		Retail Chickens (193)	11.9	[7.7 - 17.3]		6.7	48.2	28.0	5.2		0.5							11.4	
		등 HACCP (693)	8.7	[6.7 - 11.0]	0.7	16.3	58.3	15.3	0.4	0.3	0.1	0.1					0.1	8.2	
		g も 発 Retail Ground Turkey (3)	0.0	[0.0 - 70.8]			100.0												
	Erythromycin	Humans (134)	9.0	[4.7 - 15.1]				0.7	5.2	27.6	21.6	19.4	14.9	1.5			1.5	7.5	
		Retail Chickens (193)	11.4	[7.3 - 16.7]				0.5	14.5	23.3	37.8	9.3	1.6	1.6			2.1	9.3	
		RACCP (693)	8.5	[6.5 - 10.8]			0.1	3.2	20.6	28.0	34.9	3.9	0.6	0.1		0.3	0.6	7.6	
		ହୁଁ Retail Ground Turkey (3)	0.0	[0.0 - 70.8]						66.7	33.3								

<sup>&</sup>lt;sup>1</sup> Beginning in 2008, ground beef and pork chops were no longer tested for Campylobacter due to low isolation in previous years. Data for these retail meats can be found in prior reports.

<sup>&</sup>lt;sup>2</sup> Percent resistant; Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolate with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentration.

Table 77b. Distribution of MICs and Occurrence of Resistance among Campylobacter coli Isolates, 2012

		Isolate Source		among can							Distribution	(%) of MI	Cs (µg/ml)	) <sup>4</sup>					
Antimicrobial Class	Antimicrobial Agent	(# of Isolates) 1	<b>%R</b> <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256
Phenicols	Florfenicol	Humans (134)	1.5	[0.2 - 5.3]						3.7	35.8	42.5	16.4	0.7		0.7			
		Retail Chickens (193)	0.0	[0.0 - 1.9]						3.1	76.7	19.7	0.5						
		등 HACCP (693)	0.0	[0.0 - 0.5]					0.3	8.1	84.1	7.2	0.3						
		ο Α Retail Ground Turkey (3)	0.0	[0.0 - 70.8]							100.0								
Quinolones	Ciprofloxacin	Humans (134)	33.6	[25.7 - 42.2]	0.7	1.5	9.0	29.9	20.1	5.2			2.2	5.2	11.2	13.4	1.5		
		Retail Chickens (193)	31.1	[24.6 - 38.1]			7.8	30.6	29.0	1.6				7.3	20.2	3.1	0.5		
		Retail Chickens (193)	23.2	[20.1 - 26.6]		0.1	18.3	43.0	14.1	1.2			0.4	12.3	10.0	0.4	0.1		
		Retail Ground Turkey (3)	66.7	[9.4 - 99.2]					33.3				33.3		33.3				
	Nalidixic acid	Humans (134)	33.6	[25.7 - 42.2]									23.1	40.3	3.0		4.5	29.1	
		Retail Chickens (193)	31.1	[24.6 - 38.1]									19.7	48.7	0.5		15.5	15.5	
		O HACCP (693)	23.5	[20.4 - 26.9]									46.5	30.0		0.4	12.4	10.7	
		Retail Ground Turkey (3)	66.7	[9.4 - 99.2]										33.3			33.3	33.3	
Tetracyclines	Tetracycline	Humans (134)	45.5	[36.9 - 54.3]			1.5	4.5	23.9	15.7	7.5	1.5		0.7		0.7	4.5	39.6	
		Retail Chickens (193)	48.7	[41.5 - 56.0]				2.1	30.6	5.7	10.4	2.6	0.5	0.5	0.5	1.6	2.6	43.0	
		Retail Chickens (193)	49.2	[45.4 - 53.0]				9.1	27.7	10.5	3.2	0.3	0.3	0.1	1.7	2.0	8.8	36.2	
		ος Θ Χο Retail Ground Turkey (3) Γ	66.7	[9.4 - 99.2]					33.3									66.7	

<sup>&</sup>lt;sup>1</sup> Beginning in 2008, ground beef and pork chops were no longer tested for Campylobacter due to low isolation in previous years. Data for these retail meats can be found in prior reports.

<sup>&</sup>lt;sup>2</sup> Percent resistant; Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

#### Antimicrobial Susceptibility among Campylobacter coli

#### **MIC Distributions**

Table 78a. Distribution of MICs and Occurrence of Resistance among Campylobacter coli Isolates, 2013

		Isolate Source									Distribution		Cs (µg/ml)						
Antimicrobial Class	Antimicrobial Agent	(# of Isolates) <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256
Aminoglycosides	Gentamicin	Humans (142)	2.1	[0.4 - 6.0]						14.8	72.5	10.6					2.1		
		은 Retail Chickens (198) 한 HACCP (393) <sup>5</sup>	5.6	[2.8 - 9.7]				0.0	1.0	60.6	31.8	1.0					5.6		
		를 HACCP (393) <sup>5</sup> 5 Cecal (50)	2.3 18.0	[1.1 - 4.3] [8.6 - 31.4]				0.8	19.8	75.1 34.0	2.0 48.0						2.3 18.0		
		S	0.0	[0.0 - 52.2]						60	40								
		Retail Ground Turkey (5)  Cecal (18)	22.2	[6.4 - 47.6]						50	27.78						22.2		
		© Cecal (Beef) (131)	1.5	[0.2 - 5.4]						31.3	61.07	6.1					1.5		
		Cecal (Dairy) (98)	0.0	[0.0 - 3.7]					1.02	35.71	56.12	7.1							
		© Cecal (Market Hogs) (190)	0.0	[0.0 - 1.9]				0.5		4.21	85.79	9.5							
		© Cecal (Market Hogs) (190)  Cecal (Sows) (163)	0.0	[0.0 - 2.2]						6.75	80.98	12.3							
Ketolides	Telithromycin	Humans (142)	21.8	[15.3 - 29.5]				0.7	10.6	19.7	5.6	25.4	16.2	7.7	14.1				
Retolides	renunomyon		11.1	[7.1 - 16.3]			0.5	1.5	17.2	6.1	16.7	32.3	14.7	1.5	9.6				
		Retail Chickens (198)  HACCP (393) <sup>5</sup> Cecal (50)	6.9	[4.6 - 9.8]	0.3		0.5	3.3	11.5	9.2	36.4	26.5	6.1	1.5	5.3				
		ਤੌਂ Cecal (50)	10.0	[3.3 - 21.8]					24.0	10.0	22.0	22.0	12.0	2.0	8.0				
		Retail Ground Turkey (5)	0.0	[0.0 - 52.2]							40.0	20.0	40.0						
		를 Cecal (18)	16.7	[3.6 - 41.4]					11.1	11.1	11.1	44.4	5.6		16.7				
		⊕ Cecal (Beef) (131)	3.8	[1.3 - 8.7]					0.8	4.6	7.6	38.2	45.0	1.5	2.3				
		Cecal (Dairy) (98)	7.1	[2.9 - 14.2]					3.1	3.1	6.1	41.8	38.8	2.0	5.1				
		g Cecal (Market Hogs) (190)	32.6	[26.0 - 39.8]					1.6	5.8	22.6	30.0	7.4	4.7	27.9				
		Cecal (Market Hogs) (190)  Cecal (Sows) (163)	17.2	[11.7 - 23.9]					6.8	4.9	22.7	36.8	11.7	1.8	15.3				
Lincosamides	Clindamycin	Humans (142)	21.1	[14.7 - 28.8]				4.9	30.3	28.2	15.5	3.5	1.4	4.9	9.2	2.1			
		2 Retail Chickens (198)	10.1	[6.3 - 15.2]		0.5	2.0	19.7	52.5	13.1	2.0	2.5	4.0	2.5	1.0				
		Retail Chickens (198)  HACCP (393) <sup>5</sup>	10.4	[7.6 - 13.9]			3.3	40.7	39.4	4.6	1.5	2.3	5.9	1.8	0.3	0.3			
		Ö Cecal (50)	14.0	[5.8 - 26.7]			2.0	24.0	44.0	12.0	4.0		10.0	4.0					
		Retail Ground Turkey (5)	0.0	[0.0 - 52.2]				20.0	40.0	40.0									
		는 Cecal (18)	16.7	[3.6 - 41.4]				22.2	44.4	16.7			11.1	5.6					
		© Cecal (Beef) (131)	8.4	[4.3 - 14.5]			8.0	6.9	13.0	51.9	19.1	1.5	3.1	2.3	8.0	0.8			
		Cecal (Dairy) (98)	4.1	[1.1 - 10.1]			1.0	7.1	14.3	43.9	29.6	2.0	2.0						
		Cecal (Market Hogs) (190)	37.9	[31.0 - 45.2]				2.6	31.1	22.6	5.8	2.6	7.4	13.2	11.1	3.7			
		ර් Cecal (Sows) (163)	19.6	[13.8 - 26.6]				7.4	33.7	31.9	7.4	3.1	1.8	4.9	9.2	0.6			
Macrolides	Azithromycin	Humans (142)	16.9	[11.1 - 24.1]		0.7	12.0	38.7	29.6	2.1								16.9	
		Retail Chickens (198)	9.6	[5.9 - 14.6]	1.0	12.1	52.0	22.7	2.5									9.6	
		출 HACCP (393) <sup>5</sup> C Cecal (50)	10.7 14.0	[7.8 - 14.2] [5.8 - 26.7]	0.3	16.8 8.0	54.2 56.0	16.3 18.0	1.5 4.0	0.3								10.7 14.0	
		Retail Ground Turkey (5)	0.0	[0.0 - 52.2]		20.0	20.0	60.0											
		E Cecal (18)	16.7	[3.6 - 41.4]		5.6	50.0	27.8										16.7	
			4.6			4.6	12.2	55.7	22.1	0.8								4.6	
		© Cecal (Beef) (131) Cecal (Dairy) (98)	1.0	[1.7 - 9.7] [0.0 - 5.6]		5.1	12.2	63.3	17.4	1.0								1.0	
		()/ (/	_	[25.0 - 38.7]														31.6	
		© Cecal (Market Hogs) (190)  Cecal (Sows) (163)	31.6 17.2	[25.0 - 38.7]		1.6 3.7	30.0 34.4	32.1 39.3	4.7 4.9	0.6								31.6 17.2	
	F thi-					0.7	01	00.0			04.0	40.0	40.4	0.7	0.7		0.7		
	Erythromycin	Humans (142)	17.6	[11.7 - 24.9]				2.0	5.6	21.1	24.6	16.9	13.4	0.7	0.7		0.7	16.2	
		Retail Chickens (198)  HACCP (393) <sup>5</sup> Cecal (50)	9.6 10.7	[5.9 - 14.6] [7.8 - 14.2]		0.3		3.0 2.3	16.2 17.6	19.7 27.0	35.4 36.9	14.7 4.1	1.0 1.0	0.5		0.8	1.0 1.8	8.6 8.1	
		Ö Cecal (50)	14.0	[5.8 - 26.7]				2.0	24.0	26.0	26.0	6.0	2.0	-			2.0	12.0	
		Retail Ground Turkey (5)	0.0	[0.0 - 52.2]						40.0	40.0	20.0							
		본 Cecal (18)	16.7	[3.6 - 41.4]					16.7	16.7	44.4	5.6						16.7	
		© Cecal (Beef) (131)	4.6	[1.7 - 9.7]					5.3	6.1	16.8	63.4	3.8				0.8	3.8	
		Cecal (Dairy) (98)	1.0	[0.0 - 5.6]					9.2	3.1	24.5	59.2	3.1					1.0	
		은 Cecal (Market Hogs) (190)	31.6	[25.0 - 38.7]					2.6	22.6	33.7	9.0	0.5					31.6	
		© Cecal (Market Hogs) (190)  Cecal (Sows) (163)	17.2	[11.7 - 23.9]				0.6	8.6	18.4	41.7	11.7	1.8				0.6	16.6	
1		s were no longer tosted for Campul													1				

<sup>&</sup>lt;sup>1</sup> Beginning in 2008, ground beef and pork chops were no longer tested for Campylobacter due to low isolation in previous years. Data for these retail meats can be found in prior reports.

<sup>&</sup>lt;sup>2</sup> Percent resistant; Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>\*</sup> Percent resistant; Discrepancies between %r and sums or distribution with a sum of distribution of the light of the Output Percent resistant; (%R) were calculated using the Clopper-Pearson exact method

\*The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

\*\*Isolates were susceptibility tested by ARS from Jan-Sept 2013 and by FSIS from Oct-Dec 2013\*\*

Table 78b. Distribution of MICs and Occurrence of Resistance among Campylobacter coli Isolates, 2013

		Isolate Source		uniong our			5010	, 20			Distribution	n (%) of MI	Cs (µg/ml)	4					
Antimicrobial Class	Antimicrobial Agent	(# of Isolates) 1	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256
Phenicols	Florfenicol	Humans (142)	0.7	[0.0 - 3.9]						1.4	35.9	49.3	12.7	0.7					
		Retail Chickens (198)	0.0	[0.0 - 1.8]						5.1	82.3	12.6							
		Retail Chickens (198)  HACCP (393) <sup>5</sup> Cecal (50)	0.0	[0.0 - 0.9]		0.3			0.5	6.4	84.7	7.6	0.5						
		· · ·	0.0	[0.0 - 7.1]						2.0	80.0	16.0	2.0						
		Retail Ground Turkey (5) Cecal (18)	0.0	[0.0 - 52.2]				40.0	60.0										
		근 Cecal (18)	0.0	[0.0 - 18.5]							88.9	5.6	5.6						
		© Cecal (Beef) (131)	1.5	[0.2 - 5.4]						6.9	51.2	40.5		8.0	0.8				
		Cecal (Dairy) (98)	0.0	[0.0 - 3.7]						1.0	52.0	45.9	1.0						
		Cecal (Market Hogs) (190)	0.0	[0.0 - 1.9]						19.5	70.0	10.5							
		ර් Cecal (Sows) (163)	0.0	[0.0 - 2.2]						11.0	78.5	10.4							
Quinolones	Ciprofloxacin	Humans (142)	34.5	[26.7 - 42.9]			4.2	26.1	28.2	7.0			0.7	7.0	13.4	10.6	2.1	0.7	
		g Retail Chickens (198)	20.2	[14.8 - 26.5]		0.5	7.6	33.8	36.4	1.5				6.1	10.6	3.0	0.5		
		Retail Chickens (198)  HACCP (393) <sup>5</sup> Cecal (50)	21.9	[17.9 - 26.3]		0.5	14.2	43.0	19.6	8.0			1.0	12.5	7.9	0.3	0.3		
			24.0	[13.1 - 38.2]			6.0	34.0	34.0	2.0				6.0	16.0	2.0			
		Retail Ground Turkey (5)  Cecal (18)	0.0	[0.0 - 52.2]				40.0	60.0										
		Ē Cecal (18)	66.7	[41.0 - 86.7]				11.1	22.2					5.6	38.9	22.2			
		© Cecal (Beef) (131)	52.7	[43.8 - 61.5]		0.8	3.1	30.5	12.2	8.0				6.9	33.6	9.2	3.1		
		Cecal (Dairy) (98)	30.6	[21.7 - 40.7]		1.0	7.1	48.0	13.3		1.0			1.0	19.4	9.2			
		g Cecal (Market Hogs) (190)	7.4	[4.1 - 12.1]			9.0	53.2	28.4	2.1				1.6	4.7	0.5	0.5		
		O Cecal (Sows) (163)	3.7	[1.4 - 7.8]			6.8	60.7	27.0	1.8				0.6	1.8	1.2			
	Nalidixic acid	Humans (142)	35.2	[27.4 - 43.7]									19.0	38.7	7.0	0.7	3.5	31.0	
		2 Retail Chickens (198)	20.2	[14.8 - 26.5]									37.9	41.4	0.5	1.0	13.1	6.1	
		Retail Chickens (198)	22.1	[18.1 - 26.6]									53.7	23.4	0.8	0.8	11.2	10.2	
		Ö Cecal (50)	24.0	[13.1 - 38.2]									40.0	34.0	2.0		12.0	12.0	
		Retail Ground Turkey (5)  Cecal (18)	0.0	[0.0 - 52.2]										100.0					
		☐ Cecal (18)	66.7	[41.0 - 86.7]									5.6	27.8			55.6	11.1	
		⊕ Cecal (Beef) (131)	52.7	[43.8 - 61.5]									6.9	24.4	16.0	0.8	3.8	48.1	
		Cecal (Dairy) (98)	29.6	[20.8 - 39.7]									10.2	39.8	20.4		4.1	25.5	
		P Cecal (Market Hogs) (190)	7.4	[4.1 - 12.1]									17.9	70.5	4.2		1.1	6.3	
		Cecal (Market Hogs) (190) Cecal (Sows) (163)	3.7	[1.4 - 7.8]									21.5	72.4	2.5		0.6	3.1	
Tetracyclines	Tetracycline	Humans (142)	51.4	[42.9 - 59.9]				4.2	21.8	16.9	5.6				0.7			50.7	
	•	g Retail Chickens (198)	47.0	[39.9 - 54.2]				2.5	30.3	17.2	3.0		0.5		2.5	2.0	5.1	36.9	
		(5) HACCP (393) <sup>5</sup> (5) Cecal (50)	58.5	[53.5 - 63.4]			0.3	5.6	23.2	10.2	1.5	0.8	0.5	0.3	1.5	6.4	17.0	32.8	
		ర్ Cecal (50)	52.0	[37.4 - 66.3]				4.0	26.0	12.0	6.0		2.0				10.0	40.0	
		Retail Ground Turkey (5)	40.0	[5.3 - 85.3]					40.0	20.0								40.0	
		폴 Cecal (18)	77.8	[52.4 - 93.6]					5.6	16.7						5.6	16.7	55.6	
		⊕ Cecal (Beef) (131)	74.0	[65.7 - 81.3]				1.5	3.1	11.5	9.9				2.3	1.5	3.8	66.4	
		Cecal (Dairy) (98)	65.3	[55.0 - 74.6]					4.1	21.4	9.2				1.0	1.0	5.1	58.2	
		은 Cecal (Market Hogs) (190)	84.2	[78.2 - 89.1]				1.1	7.9	4.2	2.1	0.5	1.6	4.7	12.1	12.6	14.7	38.4	
		© Cecal (Market Hogs) (190)  Cecal (Sows) (163)	76.7	[69.4 - 82.9]				0.6	9.8	9.8	1.8	1.2	2.5	6.1	11.7	11.7	16.6	28.2	

Beginning in 2008, ground beef and pork chops were no longer tested for *Campylobacter* due to low isolation in previous years. Data for these retail meats can be found in prior reports. Percent resistant; Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

 $<sup>^{\</sup>rm 5}$  Isolates were susceptibility tested by ARS from Jan-Sept 2013 and by FSIS from Oct-Dec 2013

## Resistance by Year

Table 79a. Antimicro			J	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tes	ited		Humans	25	22	26	99	97	105	115	142	115	148	134	142
		kens	Retail Chickens	90	142	196	151	145	143	181	176	148	210	193	198
		Chickens	HACCP	288	247	186	380	123	76	28	81	100	233	693	393
			Cecal												50
		Turkeys	Retail Ground Turkey	2	1	5	9	10	14	19	16	7	18	3	5
			Cecal (Beef)												18 131
		Cattle	Cecal (Dairy)												98
		Swine	Cecal (Market Hog)												190
	Antimicrobial	S	Cecal (Sow)												163
Antimiorable Class	(Resistance Breakpoint) 1		Isolate Source <sup>2</sup>												
Antimicrobial Class Aminoglycosides	Gentamicin		Humans	0.0%	4.5%	3.8%	3.0%	1.0%	0.0%	1.7%	3.5%	12.2%	12.2%	6.0%	2.1%
	(MIC > 2 µg/ml)	-	Turnans	0	1	1	3	1	0	2	5	14	18	8	3
		St	Retail Chickens	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.7% 1	1.7% 3	5.7% 10	12.8% 19	18.1% 38	4.1% 8	5.6% 11
		Chickens	HACCP	0.0% 0	0.0% 0	0.0%	0.3% 1	0.0% 0	1.3% 1	3.6% 1	2.5% 2	5.0% 5	5.6% 13	3.9% 27	2.3% 9
		ြင်	Cecal	U	U	U						J	13		18.0%
				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	9 0.0%
		Turkeys	Retail Ground Turkey	0	0	0	0.070	0.070	0.070	0	0	0	0.070	0.076	0
		₽	Cecal												22.2% 4
		٩	Cecal (Beef)												1.5%
		Cattle	Cecal (Dairy)												0.0%
															0.0%
		Swine	Cecal (Market Hog)												0
		Š	Cecal (Sow)												0.0% 0
Ketolides	Telithromycin		Humans				8.1%	9.3%	9.5%	10.4%	7.0%	13.9%	10.8%	11.2%	21.8%
	(MIC > 4 μg/ml)		I			10.7%	9.9%	9 5.5%	10 7.0%	12 9.4%	10 5.1%	16 4.1%	16 5.7%	15 14.0%	31 11.1%
		sus	Retail Chickens			21	15	8	10	17	9	6	12	27	22
		Chickens	HACCP				0.1% 29	0.1% 15	0.1% 11	0.0% 1	0.1% 5	0.0% 4	0.0% 7	7.1% 49	6.9% 27
			Cecal												10.0% 5
		s,	Retail Ground Turkey			0.0%	22.2%	0.0%	0.0%	5.3%	0.0%	14.3%	5.6%	0.0%	0.0%
		Turkeys				0	2	0	0	1	0	1	1	0	0 16.7%
		Ĺ	Cecal												3
		#le	Cecal (Beef)												3.8% 5
		Cattle	Cecal (Dairy)												7.1%
			Cecal (Market Hog)												7 32.6%
		Swine													62 17.2%
		0)	Cecal (Sow)												28
Lincosamides	Clindamycin (MIC > 1 µg/ml)		Humans	8.0% 2	18.2% 4	11.5% 3	8.1% 8	14.4% 14	9.5% 10	14.8% 17	7.7% 11	17.4% 20	16.9% 25	16.4% 22	21.1% 30
	()		Retail Chickens			9.2%	10.6%	10.3%	0.6%	8.8%	8.0%	5.4%	5.2%	12.4%	10.1%
		kens	HACCP	15.3%	16.6%	18 9.7%	16 10.0%	15 12.2%	9 14.5%	16 10.7%	14 7.4%	5.0%	11 2.6%	24 8.5%	20 10.4%
		Chickens	TIACCE	44	41	18	38	15	11	3	6	5	6	59	41
			Cecal												14.0% 7
		şys	Retail Ground Turkey			0.0%	22.2% 2	10.0% 1	21.4% 3	10.5% 2	0.0% 0	14.3% 1	5.6% 1	0.0%	0.0% 0
		Turkeys	Cecal			U		'	3		U	1	1	U	16.7%
		Ŀ													3 8.4%
		Cattle	Cecal (Beef)												11
		ű	Cecal (Dairy)												4.1% 4
		Φ	Cecal (Market Hog)												37.9%
		Swine	Cacal (Sour)												72 19.6%
			Cecal (Sow)					may differ							32

<sup>1</sup> Resistance figures for gentamicin, clindamycin, azithromycin, erythromycin, nalidixic acid, and doxycycline in this report may differ from previously published figures because breakpoints have been revised for these antimicrobials

<sup>&</sup>lt;sup>2</sup> Beginning in 2008, ground beef and pork chops were no longer tested for *Campylobacter* due to low isolation in previous years. Data for these retail meats can be found in prior reports.

Table 79b. Antimicr	obial Resistance	amo	ong Campylobacter				2005	2006	2007	2000	2000	2010	2011	2012	2012
Year Number of Isolates Teste	d		Humans	<b>2002</b> 25	<b>2003</b> 22	<b>2004</b> 26	<b>2005</b> 99	<b>2006</b> 97	<b>2007</b> 105	<b>2008</b> 115	<b>2009</b> 142	<b>2010</b> 115	<b>2011</b> 148	<b>2012</b> 134	<b>2013</b> 142
		sus	Retail Chickens	90	142	196	151	145	143	181	176	148	210	193	198
		Chickens	HACCP	288	247	186	380	123	76	28	81	100	233	693	393
			Cecal												50
		Turkeys	Retail Ground Turkey	2	1	5	9	10	14	19	16	7	18	3	5
			Cecal												18
		Cattle	Cecal (Beef) Cecal (Dairy)												131 98
			Cecal (Market Hog)												190
		Swine	Cecal (Sow)												163
	Antimicrobial (Resistance														
Antimicrobial Class	Breakpoint) 1		Isolate Source <sup>2</sup>												
Macrolides	Azithromycin (MIC > 0.5 μg/ml)		Humans	8.0% 2	13.6% 3	3.8% 1	4.0% 4	9.3% 9	5.7% 6	10.4% 12	3.5% 5	7.0% 8	5.4% 8	9.0% 12	16.9% 24
	, ,		Retail Chickens			9.7%	9.9%	6.2%	7.0%	9.9%	4.6%	4.1%	4.3%	11.9%	9.6%
		kens	114.000	19.4%	20.2%	19 9.1%	15 8.7%	9.8%	10 14.5%	18 10.7%	8 6.2%	6 4.0%	9 3.9%	23 8.7%	19 10.7%
		Chickens	HACCP	56	50	17	33	12	11	3	5	4	9	60	42
			Cecal												14.0% 7
		ys	Retail Ground Turkey			0.0%	22.2%	0.0%	0.0%	5.3%	0.0%	14.3%	5.6%	0.0%	0.0%
		Turkeys	Caral			0	2	0	0	1	0	1	1	0	16.7%
		_	Cecal												3
		ttle	Cecal (Beef)												4.6% 6
		Cattle	Cecal (Dairy)												1.0%
			Coool (Market Harr)												31.6%
		Swine	Cecal (Market Hog)												60
		Ś	Cecal (Sow)												17.2% 28
	Erythromycin		Humans	4.0%	9.1%	3.8%	4.0%	8.2%	5.7%	10.4%	3.5%	5.2%	2.7%	9.0%	17.6%
	(MIC > 8 μg/ml)		Retail Chickens	7.8%	2 7.8%	9.2%	9.9%	5.5%	6 7.0%	12 9.9%	5 4.6%	6 4.1%	4 5.2%	12 11.4%	25 9.6%
		sus	Retail Chickens	7	11	18	15	8	10	18	8	6	11	22	19
		Chickens	HACCP	18.8% 54	20.2% 50	9.1% 17	8.4% 32	8.9% 11	14.5% 11	10.7% 3	6.2% 5	4.0% 4	3.4% 8	8.5% 59	10.7% 42
		0	Cecal												14.0%
		s	Retail Ground Turkey	0.0%	0.0%	0.0%	22.2%	0.0%	0.0%	5.3%	0.0%	14.3%	5.6%	0.0%	0.0%
		Turkeys	Retail Glound Furkey	0	0	0	2	0	0	1	0	1	1	0	0 16.7%
		ľ	Cecal												3
		Ф	Cecal (Beef)												4.6% 6
		Cattle	Cecal (Dairy)												1.0%
															31.6%
		Swine	Cecal (Market Hog)												60
		Sw	Cecal (Sow)												17.2% 28
Phenicols	Florfenicol		Humans				1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	1.5%	0.7%
	(MIC> 16 μg/ml) 3,4	-	1			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1 0.0%	2 0.0%	0.0%
		ns	Retail Chickens			0	0	0	0	0	0	0	0	0	0
		Chickens	HACCP	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0%
		Ö	Cecal												0.0%
		_				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys	Retail Ground Turkey			0.070	0.070	0.070	0.070	0.070	0.070	0.076	0.070	0.070	0
		TuT	Cecal												0.0%
		•	Cecal (Beef)												1.5%
		Cattle													0.0%
		Ľ	Cecal (Dairy)												0
		ne	Cecal (Market Hog)												0.0%
		Swine	Cecal (Sow)												0.0%
15		<u> </u>	thromycin, erythromycin,		-:						h   6			h h	0

<sup>1</sup> Resistance figures for gentamicin, clindamycin, azithromycin, erythromycin, nalidixic acid, and doxycycline in this report may differ from previously published figures because breakpoints have been revised for these antimicrobials

<sup>&</sup>lt;sup>2</sup> Beginning in 2008, ground beef and pork chops were no longer tested for Campylobacter due to low isolation in previous years. Data for these retail meats can be found in prior reports.

<sup>&</sup>lt;sup>3</sup> For Humans and Chickens at HACCP, results prior to 2005 are for Chloramphenicol

<sup>&</sup>lt;sup>4</sup> For florfenicol, only a susceptible breakpoint ( ≤ 4  $\mu$ g/ml) has been established. In this report, isolates with an MIC ≥ 8  $\mu$ g/ml are categorized as resistant.

Table 79c. Antimicr	obial Resistance	amo	ong Campylobacter	coli Iso 2002	lates, 20 2003	02-2013 2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tester	i		Humans	25	22	26	99	97	105	115	142	115	148	134	142
		ens	Retail Chickens	90	142	196	151	145	143	181	176	148	210	193	198
		Chickens	HACCP	288	247	186	380	123	76	28	81	100	233	693	393
		L	Cecal												50
		Turkeys	Retail Ground Turkey Cecal	2	1	5	9	10	14	19	16	7	18	3	5 18
		_	Cecal (Beef)												131
		Cattle	Cecal (Dairy)												98
		Swine	Cecal (Market Hog)												190
	Antimicrobial	Š	Cecal (Sow)												163
	(Resistance		Jacks Course 2												
Antimicrobial Class  Quinolones	Breakpoint) 1 Ciprofloxacin		Isolate Source 2	12.0%	22.7%	30.8%	25.3%	21.6%	28.6%	29.6%	23.9%	30.4%	36.5%	33.6%	34.5%
	(MIC > 0.5 µg/ml)		Humans	3	5	8	25	21	30	34	34	35	54	45	49
		S	Retail Chickens	17.8% 16	13.4% 19	16.8% 33	29.8% 45	22.1% 32	25.9% 37	20.4% 37	18.2% 32	13.5% 20	18.1% 38	31.1% 60	20.2% 40
		Chickens	HACCP	16.3% 47	20.2% 50	26.9%	22.1%	15.4%	15.8%	14.3% 4	22.2% 18	23.0% 23	27.9% 65	23.2%	21.9%
		ပ်	Cecal	47	50	50	84	19	12	4	10	23	00	161	24.0%
				50.0%	100.0%	0.0%	55.6%	30.0%	50.0%	47.4%	43.8%	57.1%	50.0%	66.7%	12 0.0%
		Turkeys	Retail Ground Turkey	1	100.0%	0.0%	55.6%	30.0%	7	9	7	4	9	2	0
		Tur	Cecal												66.7% 12
		4	Cecal (Beef)												52.7%
		Cattle													69 30.6%
			Cecal (Dairy)												30
		ne	Cecal (Market Hog)												7.4% 14
		Swine	Cecal (Sow)												3.7%
	Nalidixic acid		Llumana	12.0%	22.7%	34.6%	27.3%	23.7%	30.5%	29.6%	24.6%	30.4%	35.8%	33.6%	6 35.2%
	(MIC > 16 µg/ml)		Humans	3	5	9	27	23	32	34	35	35	53	45	50
		SL	Retail Chickens			16.3% 32	29.1% 44	20.7% 30	25.9% 37	20.4% 37	18.2% 32	14.2% 21	18.1% 38	31.1% 60	20.2% 40
		Chickens	HACCP	18.1% 52	21.9% 54	28.0% 52	22.4% 85	15.4% 19	15.8% 12	14.3% 4	22.2% 18	23.0% 23	27.9% 65	23.5% 163	22.1% 87
		ਠੇ	Cecal	JZ	54	JZ	00	10	12	7	10	20	00	103	24.0%
						0.0%	55.6%	30.0%	50.0%	47.4%	43.8%	57.1%	50.0%	66.7%	12 0.0%
		Turkeys	Retail Ground Turkey			0	5	3	7	9	7	4	9	2	0
		μ	Cecal												66.7% 12
		a)	Cecal (Beef)												52.7%
		Cattle	Cocal (Doin)												69 29.6%
		<u></u>	Cecal (Dairy)												29
		Swine	Cecal (Market Hog)												7.4% 14
		Š	Cecal (Sow)												3.7% 6
Tetracyclines	Tetracycline <sup>3</sup>		Humans	40.0%	45.5%	38.5%	31.3%	39.2%	42.9%	39.1%	45.1%	50.4%	50.7%	45.5%	51.4%
	(MIC > 2 μg/ml)	-	1	10 44.4%	10 53.5%	10 46.9%	31 44.4%	38 46.9%	45 39.9%	45 48.1%	64 38.6%	58 40.5%	75 51.0%	61 48.7%	73 47.0%
		, SU	Retail Chickens	40	76	92	67	68	57	87	68	60	107	94	93
		Chickens	HACCP	51.0% 147	53.0% 131	48.9% 91	42.6% 162	54.5% 67	42.1% 32	60.7% 17	45.7% 37	56.0% 56	42.1% 98	49.2% 341	58.5% 230
		ō	Cecal		1										52.0%
				50.0%	100.0%	0.0%	88.9%	80.0%	64.3%	94.7%	75.0%	100.0%	77.8%	66.7%	26 40.0%
		Turkeys	Retail Ground Turkey	1	1	0	8	8	9	18	12	7	14	2	2
		Τ	Cecal												77.8% 14
		<u>e</u>	Cecal (Beef)												74.0% 97
		Cattle	Cecal (Dairy)												65.3%
		_													64 84.2%
		Swine	Cecal (Market Hog)												160
		Sw	Cecal (Sow)												76.7% 125
<sup>1</sup> Resistance figures for g	entamicin clindamycir	n azi	thromycin, erythromycin,	nalidixic a	cid. and do	xvcvcline in	this report	may differ	from previo	ously publis	hed figures	s because h	oreakpoints.	have been	

Resistance figures for gentamicin, clindamycin, azithromycin, erythromycin, nalidixic acid, and doxycycline in this report may differ from previously published figures because breakpoints have been revised for these antimicrobials

<sup>&</sup>lt;sup>2</sup> Beginning in 2008, ground beef and pork chops were no longer tested for *Campylobacter* due to low isolation in previous years. Data for these retail meats can be found in prior reports. <sup>3</sup> For Retail Chickens and Turkeys, results for 2002 and 2003 are for Doxycycline

Table 80a. Resistance Patterns	s an	nong	Campylobacter Sp			2002							
Year Number of Isolates Tested			Humans	2004 N/A <sup>1</sup>	<b>2005</b> 788	<b>2006</b> 709	<b>2007</b> 992	2008 1033	<b>2009</b> 1350	<b>2010</b> 1159	<b>2011</b> 1275	<b>2012</b> 1191	<b>2013</b> 1182
		sue	Retail Chickens	510	403	426	332	329	404	355	393	421	428
		Chickens	HACCP	N/A 1	567	228	166	78	117	208	344	1348	788
			Cecal  Retail Ground Turkey	7	10	40	20	40	0	-	40	2	11
	C. jejuni	Turkeys	Retail Ground Turkey HACCP	7	10	12	20	10	9	5	13	3	7
	C.	n_	Cecal										0
		Cattle	Cecal (Beef)										531
			Cecal (Dairy)										542
		Swine	Cecal (Market Hogs) Cecal (Sows)										4 6
		.,	Humans	N/A 1	99	97	105	115	142	115	148	134	142
		sues	Retail Chickens	196	151	145	143	181	176	148	210	193	198
		Chickens	HACCP Cecal	N/A 1	380	123	76	28	81	100	233	693	393 50
	_	s/	Retail Ground Turkey	5	9	10	14	19	16	7	18	3	5
	C. coli	Turkeys	HACCP										
		-	Cecal										18
		Cattle	Cecal (Beef) Cecal (Dairy)										131 98
		e e	Cecal (Market Hogs)										190
		Swine	Cecal (Sows)										163
Resistance Pattern	Spe	cies	Isolate Source <sup>1</sup>		46.3%	42.5%	44.3%	45.2%	45.9%	39.5%	33.0%	38.6%	44.6%
1. No Resistance Detected			Humans	20.004	365	301	439	467	620	458	421	460	527
		SI.	Retail Chickens	39.8% 203	42.7% 172	43.2% 184	40.1% 133	39.2% 129	40.8% 165	51.3% 182	40.5% 159	42.3% 178	46.3% 198
		Chickens	HACCP		45.7% 259	37.7% 86	33.7% 56	32.1% 25	40.2% 47	42.8% 89	47.4% 163	41.3% 557	35.3% 278
		Ö	Cecal										45.5%
	η	90	Retail Ground Turkey	42.9%	30.0%	16.7%	10.0%	0.0%	0.0%	20.0%	0.0%	0.0%	5 57.1%
	C. jejuni	Turkeys	-	3	3	2	2	0	0	1	0	0	4
	ď	-	Cecal										00.70/
		Cattle	Cecal (Beef)										30.7% 163
		ပိ	Cecal (Dairy)										36.7% 199
		ine	Cecal (Market Hogs)										0.0%
		Swir	Cecal (Sows)										16.7%
			Humans		49.5%	43.3%	38.1%	43.5%	43.7%	33.9%	31.1%	42.5%	1 31.7%
			1	36.2%	49 34.4%	42 38.6%	40 45.5%	50 38.7%	62 46.6%	39 52.0%	46 40.5%	57 30.1%	45 38.9%
		Su	Retail Chickens	71	52	56	65	70	82	77	85	58	77
		Chickens	HACCP		46.1% 175	39.0% 48	43.4% 33	28.6% 8	46.9% 38	33.0% 33	42.1% 98	36.8% 269	30.3% 119
		0	Cecal										30.0% 15
		s/	Retail Ground Turkey	100.0%	11.1%	20.0%	28.6%	5.3%	18.8%	0.0%	22.2%	0.0%	60.0%
	C. coli	Turkeys	Cecal	5	1	2	4	1	3	0	4	0	3 16.7%
		_											3 12.21.%
		attle	Cecal (Beef)										16
		Cati	Cecal (Dairy)										25.5% 25
		ne	Cecal (Market Hogs)										10.5% 20
		Swine	Cecal (Sows)										21.5%
a Buddan 1 1 2			Humans		16.2%	13.1%	18.9%	15.8%	15.1%	19.0%	23.5%	20.0%	17.3%
2. Resistance to ≥ 2 Antimicrobial Classes			Retail Chickens	8.4%	128 6.5%	93	187 7.2%	7.3%	10.9%	220 11.6%	300 14.3%	238 10.7%	204 8.9%
		Chickens	HACCP	43	26 8.8%	40 6.1%	24 14.5%	24 23.1%	44 12.0%	41 15.9%	56 15.4%	45 15.9%	38 23.0%
		Chic	Cecal		50	14	24	18	14	33	53	215	181 36.4%
	<i>*</i>	s		28.6%	10.0%	41.7%	30.0%	70.0%	44.4%	40.0%	38.5%	33.3%	4 14.3%
	C. jejuni	Turkeys	Retail Ground Turkey	2	1	5	6	7	4	2	5	1	1
	Ċ		Cecal										14.5%
		Cattle	Cecal (Beef)										77 9.6%
			Cecal (Dairy)										52 25.0%
		Swine	Cecal (Market Hogs)										1
		S	Cecal (Sows)		10.004	20.604	24.007	20.70/	24.407	20.224	40.004	20.004	33.3%
			Humans	4	19.2% 19	20.6%	21.0%	28.7%	21.1%	38.3% 44	43.2% 64	32.8% 44	35.9% 51
		us	Retail Chickens	16.3% 32	21.9% 33	20.0% 29	20.3% 29	24.3% 44	17.1% 30	24.3% 36	34.8% 73	30.1% 58	25.8% 51
		Chickens	HACCP		22.6% 86	26.8% 33	21.1% 16	25.0% 7	19.8% 16	26.0% 26	18.9% 44	23.7% 164	25.4% 100
		O	Cecal										48.0% 24
	io	ske.	Retail Ground Turkey	0.0%	55.6% 5	30.0% 3	42.9% 6	52.6% 10	37.5% 6	71.4% 5	55.6% 10	33.3% 1	0.0%
	C. coli	Turkeys	Cecal										66.7% 12
		ē	Cecal (Beef)										58.8% 77
		Cattle	Cecal (Dairy)										34.7%
		ө	Cecal (Market Hogs)										34 43.2%
		Swine	Cecal (Sows)										82 22.7%
1	<u> </u>		g in 2004 and for human						7				37

Table 80b. Resistance Pattern	s an	non	g Campylobacter Sp										
Year Number of Isolates Tested			Humans	2004 N/A <sup>1</sup>	<b>2005</b> 788	<b>2006</b> 709	<b>2007</b> 992	2008 1033	<b>2009</b> 1350	<b>2010</b> 1159	<b>2011</b> 1275	<b>2012</b> 1191	2013 1182
		ns	Retail Chickens	510	403	426	332	329	404	355	393	421	428
		Chickens	HACCP	N/A 1	567	228	166	78	117	208	344	1348	788
		ò	Cecal										11
	juni	Turkeys	Retail Ground Turkey HACCP	7	10	12	20	10	9	5	13	3	7
	C. jejuni	Ţ	Cecal										0
		ttle	Cecal (Beef)										531
		Cattle	Cecal (Dairy)										542
		Swine	Cecal (Market Hogs)										4
		Ó	Cecal (Sows) Humans	N/A 1	99	97	105	115	142	115	148	134	6 142
		Su	Retail Chickens	196	151	145	143	181	176	148	210	193	198
		Chickens	HACCP	N/A 1	380	123	76	28	81	100	233	693	393
			Cecal	_		40		40	40	_	40		50
	C. coli	Turkeys	Retail Ground Turkey HACCP	5	9	10	14	19	16	7	18	3	5 0
	C)	_	Cecal										18
		Cattle	Cecal (Beef)										131
		_	Cecal (Dairy)										98
		Swine	Cecal (Market Hogs) Cecal (Sows)										190 163
Resistance Pattern	Spe	cies	Isolate Source <sup>1</sup>										
3. Resistance to ≥ 3			Humans		2.4% 19	1.3% 9	2.0% 20	3.5% 36	2.7% 37	4.2% 49	7.5% 96	4.8% 57	3.1% 37
Antimicrobial Classes		s	Retail Chickens	1.0% 5	0.5% 2	0.7% 3	0.6%	1.2%	1.0%	0.6%	0.5%	1.0%	1.2%
		Chickens	HACCP	Ť	1.4%	0.9%	0.0%	1.3%	0.0%	0.0%	1.2%	1.2% 16	2.0%
		Chi	Cecal		°		U	1	U	U	4	10	27.3%
	'n	s/	Retail Ground Turkey	0.0%	0.0%	0.0%	5.0%	10.0%	11.1%	0.0%	0.0%	0.0%	0.0%
	C. jejuni	Turkeys	Cecal	0	0	0	1	1	1	0	0	0	0
	٥												13.0%
		Cattle	Cecal (Beef)										69 7.6%
		_	Cecal (Dairy)										41 25.0%
		Swine	Cecal (Market Hogs)										1 33.3%
		Ø	Cecal (Sows)		7.40/	10.00/	0.00/	0.70/	7.00/	10.00/	11.00/	40.70/	2
			Humans		7.1% 7	10.3% 10	8.6% 9	8.7% 10	7.0% 10	13.9% 16	14.9% 22	12.7% 17	21.1% 30
		SL	Retail Chickens	9.2% 18	9.9% 15	6.9% 10	7.0% 10	9.9% 18	5.1% 9	4.1% 6	4.8% 10	11.4% 22	9.6% 19
		Chickens	HACCP		8.7% 33	8.9% 11	14.5% 11	7.1% 2	6.2% 5	4.0% 4	4.7% 11	9.7% 67	10.2% 40
		O	Cecal										26.0% 13
	coli	sys	Retail Ground Turkey	0.0%	22.2% 2	10.0%	21.4% 3	10.5% 2	0.0%	14.3% 1	5.6% 1	0.0%	0.0%
	S.	Turkeys	Cecal	J	_			_				J	61.1%
			Cecal (Beef)										43.5%
		Cattle	Cecal (Dairy)										57 25.5%
		m	Cecal (Market Hogs)										25 37.4%
		Swine	Cecal (Sows)										71 19.6%
		-			1.0%	0.7%	1.3%	1.9%	1.6%	1.9%	3.6%	1.8%	32 2.2%
4. Resistance to ≥ 4 Antimicrobial Classes		_	Humans	0.8%	8 0.3%	5 0.7%	13 0.0%	20 0.0%	21 0.0%	22 0.3%	46 0.3%	21 0.0%	26 0.0%
		ens	Retail Chickens	4	1 0.7%	3	0.0%	0.0%	0.0%	1 0.0%	1 0.3%	0.7%	0 1.4%
		Chickens	HACCP		4	1	0.0%	0.0%	0.078	0.076	1	9	11 0.0%
			Cecal	0.00/	0.004	0.00/	E 00/	40.00/	0.004	0.007	0.004	0.004	0
	C. jejuni	Turkeys	Retail Ground Turkey	0.0% 0	0.0% 0	0.0%	5.0% 1	10.0% 1	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%
	Ċ.	μ	Cecal										
		Cattle	Cecal (Beef)										0.2% 1
		Sa	Cecal (Dairy)										0.6% 3
		ne	Cecal (Market Hogs)										0.0%
		Swi	Cecal (Sows)										0.0%
			Humans		4.0%	6.2%	5.7%	7.0%	4.2%	7.0%	4.7%	9.0%	14.1%
			Retail Chickens	3.6%	6.6%	2.8%	3.5%	2.8%	2.8%	4.1%	3.8%	7.3%	4.6%
		Chickens	HACCP	7	10 5.8%	6.5%	5.3%	0.0%	5 6.2%	0.0%	2.6%	14 5.6%	9 4.1%
		Chic	Cecal		22	8	4	0	5	0	6	39	16 16.0%
		"		0.0%	22.2%	0.0%	0.0%	5.3%	0.0%	14.3%	5.6%	0.0%	8
	coli	Turkeys	Retail Ground Turkey	0	2	0	0	1	0	1	1	0	0 22.2%
	Ċ	Ĭ	Cecal										4 8.4%
		Cattle	Cecal (Beef)										11
		ŭ	Cecal (Dairy)										3.1% 3
		Swine	Cecal (Market Hogs)										32.1% 61
		Š	Cecal (Sows)										17.2% 28

<sup>1</sup> Data are reported for retail meats beginning in 2004 and for humans and chickens beginning in 2005 when the broth microdilution method was first used

Table 80c. Resistance Pattern Year	s ar	non	g Campylobacter Sp	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested			Humans	N/A <sup>1</sup>	788	709	992	1033	1350	1159	1275	1191	1182
		ens	Retail Chickens	510	403	426	332	329	404	355	393	421	428
		Chickens	HACCP	N/A 1	567	228	166	78	117	208	344	1348	788
		_	Cecal										11
	C. jejuni	Turkeys	Retail Ground Turkey HACCP	7	10	12	20	10	9	5	13	3	7
	C. je	Ţ	Cecal										0
		tle.	Cecal (Beef)										531
		Cattle	Cecal (Dairy)										542
		ne	Cecal (Market Hogs)										4
		Swine	Cecal (Sows)										6
			Humans	N/A 1	99	97	105	115	142	115	148	134	142
		Chickens	Retail Chickens	196	151	145	143	181	176	148	210	193	198
		Chic	HACCP Cecal	N/A 1	380	123	76	28	81	100	233	693	393 50
	ļ.,	s/	Retail Ground Turkey	5	9	10	14	19	16	7	18	3	5
	C. coli	Turkeys	HACCP										0
		_	Cecal										18
		Cattle	Cecal (Beef)										131
		_	Cecal (Dairy)										98
		Swine	Cecal (Market Hogs) Cecal (Sows)										190 163
Resistance Pattern	Spe	cies	Isolate Source <sup>1</sup>										103
			Humans		1.4%	0.7%	1.4%	1.5%	1.2%	1.3%	3.0%	1.3%	1.9%
5. At least Quinolone and Macrolide Resistant	ĺ		Retail Chickens	0.4%	0.0%	5 0.0%	0.0%	15 0.0%	16 0.0%	15 0.0%	38 0.3%	16 0.0%	0.0%
		cens		2	0.7%	0	0.0%	0 1.3%	0.0%	0.0%	1 0.3%	0.5%	0.1%
		Chickens	HACCP		4	2	0	1	0	0	1	7	1 0.0%
			Cecal										0
	juni	seys	Retail Ground Turkey	0.0%	0.0%	0.0%	5.0% 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	C. jejuni	Turkeys	Cecal										
		m.	Cecal (Beef)										0.0%
		Cattle	Cecal (Dairy)										0.4%
													0.0%
		Swine	Cecal (Market Hogs)										0
	_	Ġ	Cecal (Sows)										0.0%
			Humans		2.0%	4.1% 4	1.9%	4.3% 5	2.8% 4	3.5% 4	3.4% 5	8.2% 11	9.2% 13
			Retail Chickens	0.5% 1	1.3%	0.7% 1	1.4%	1.1% 2	1.7% 3	0.7% 1	1.0%	6.2% 12	3.0% 6
		Chickens	HACCP		1.6%	1.6%	5.3%	0.0%	4.9%	0.0%	1.3%	1.7%	2.0%
		S	Cecal		6	2	4	0	4	0	3	12	2.0%
		<u> </u>		0.0%	22.2%	0.0%	0.0%	0.0%	0.0%	14.3%	0.0%	0.0%	0.0%
	ijo	Turkeys	Retail Ground Turkey	0	2	0	0	0	0	1	0	0	0 16.7%
	Ċ	2	Cecal										3
		₽	Cecal (Beef)										0.8%
		Cattle	Cecal (Dairy)										0.0%
		Ф	Cecal (Market Hogs)										1.6%
		Swine	Cecal (Sows)										0.6%
					14.0%	11.1%	17.4%	13.9%	13.6%	12.7%	15.6%	16.6%	1 16.6%
6. At least Quinolone and			Humans	6.5%	110 5.5%	79 8.5%	173 6.6%	144 6.1%	183 9.9%	147 10.7%	199 13.7%	198 9.3%	196 7.2%
Tetracycline Resistant	ĺ	su.	Retail Chickens	33	23	36	22	20	40	38	54	39	31
		Chickens	HACCP		7.8% 44	5.7% 13	13.9% 23	20.5% 16	11.1% 13	15.4% 32	14.2% 49	15.0% 202	20.3% 160
		0	Cecal										27.3% 3
	ini	.ys	Retail Ground Turkey	14.3% 1	10.0%	41.7%	30.0% 6	60.0% 6	44.4% 4	40.0% 2	38.5%	33.3%	14.3%
	C. jejuni	Turkeys	Cecal		1	5	0	0	4		5	1	1
	٦												13.0%
		Cattle	Cecal (Beef)										69 7.2%
		0	Cecal (Dairy)										39
		Swine	Cecal (Market Hogs)										25.0% 1
		Ś	Cecal (Sows)										0.0%
			Humans		10.1% 10	10.3% 10	13.3% 14	17.4% 20	14.8% 21	19.1% 22	23.6% 35	24.6% 33	23.9% 34
	ĺ		Retail Chickens	7.1%	12.6%	10.3%	14.7%	13.3%	8.0%	8.8%	10.5%	16.1%	12.1%
		Chickens	HACCP	14	19 14.5%	15 10.6%	21 10.5%	24 14.3%	14 16.0%	13 16.0%	22 12.0%	31 13.4%	24 15.3%
		Chic			55	13	8	4	13	16	28	93	60 14.0%
	ĺ	<u> </u>	Cecal	0.0%	55.6%	30.0%	42.9%	47.4%	37.5%	57.1%	50.0%	33.3%	7
	C. coli	Turkeys	Retail Ground Turkey	0.0%	55.6%	30.0%	42.9% 6	9	6	4	9	1	0
	Ċ	Tur	Cecal										61.1% 11
	ĺ	ē	Cecal (Beef)										39.7% 52
		Cattle	Cecal (Dairy)										24.5%
		6	Cecal (Market Hogs)										6.8%
		Swine											13 3.7%
		0)	Cecal (Sows)										6

<sup>&</sup>lt;sup>1</sup> Data are reported for retail meats beginning in 2004 and for humans and chickens beginning in 2005 when the broth microdilution method was first used

# Escherichia coli Data

# E. coli Isolates Tested

Table 81. Number of *E. coli* Isolates Tested, 2000-2013

	0								Year						
	Source	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
sue	Retail Chickens			282	396	400	393	418	299	306	315	357	341	386	360
Chickens	HACCP <sup>1</sup>	285	1989	2100	1365	1697	2232	1357	1510	986	877	941	614	990	
ည	Cecal														48
Turkeys	Retail Ground Turkey			304	333	376	396	388	315	300	306	369	368	391	374
Tur	Cecal														29
ø	Retail Ground Beef			295	311	338	316	295	256	250	247	269	215	271	227
Cattle	Cecal (Beef)														293
0	Cecal (Dairy)														256
Ф	Retail Pork Chops			184	218	232	205	182	152	146	147	183	146	161	208
Swine	Cecal (Market Hogs)														118
S	Cecal (Sows)														120

<sup>&</sup>lt;sup>1</sup> In 2013, chicken carcass rinsates were not sampled for *E. coli.* 

## Isolation of *E. coli* from Retail Meats

Table 82. Number and Percent of Retail Meat Samples Culture Positive for E. coli, 2012

	Retail Chickens	Retail Ground Turkey	Retail Ground Beef	Retail Pork Chops
Number of Meat Samples Tested	480	476	480	480
Number Positive for <i>E. coli</i>	386	391	371	161
Percent Positive for <i>E. coli</i>	80.4%	82.1%	77.3%	33.5%

Figure 14. Percent of Retail Meat Samples Culture Positive for E. coli, 2012

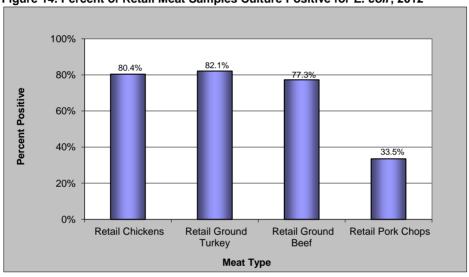
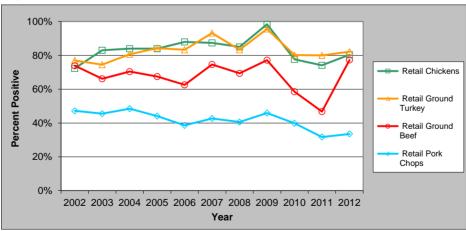


Figure 15. Percent of Retail Meat Samples Culture Positive for *E. coli* , 2002-2012



## Isolation of *E. coli* from Retail Meats

Table 83. Number and Percent of Retail Meat Samples Culture Positive for E. coli, 2013

	Retail Chickens	Retail Ground Turkey	Retail Ground Beef	Retail Pork Chops
Number of Meat Samples Tested	480	478	480	480
Number Positive for <i>E. coli</i>	360	374	227	208
Percent Positive for <i>E. coli</i>	75.0%	78.2%	47.3%	43.3%

Figure 16. Percent of Retail Meat Samples Culture Positive for E. coli, 2013

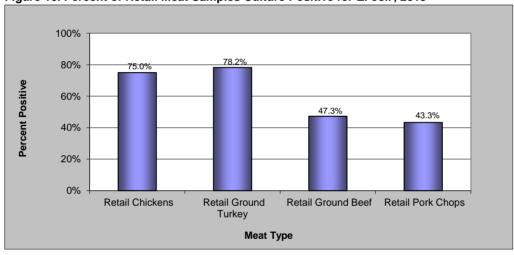
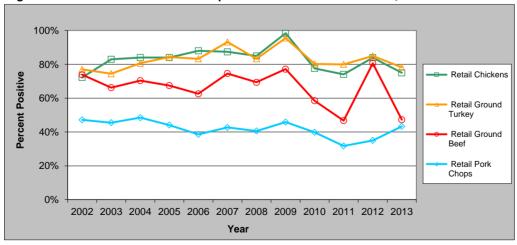


Figure 17. Percent of Retail Meat Samples Culture Positive for E. coli, 2002-2013



## Antimicrobial Susceptibility among E. coli

### **MIC Distributions**

Table 84a. Distribution of MICs and Occurrence of Resistance among E. coli Isolates, 2012

		Isolate Source										Distr	ibution (	%) of M	ICs (µg/ı	ml) <sup>4</sup>						
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] 3	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Aminoglycosides	Gentamicin	Retail Chickens (386)	3.4	30.6	[26.0 - 35.4]					0.3	5.2	53.4	6.5	0.8	3.4	6.2	24.4					
		음 HACCÞ (990)	3.2	42.1	[39.0 - 42.2]					0.8	21.0	30.2	1.8	8.0	3.2	14.1	28.0					
		ທີ່ Retail Ground Turkey (391)	3.6	40.9	[36.0 - 41.1]					0.3	5.1	43.5	6.4	0.3	3.6	6.1	34.8					
		Retail Ground Beef (271)	0.0	0.7	[0.1 - 1.0]					0.7	6.3	81.2	10.0	1.1			0.7					
		Retail Pork Chops (161)	0.6	0.6	[0.0 - 1.0]					1.9	11.2	70.2	13.7	1.9	0.6		0.6					
	Kanamycin	Retail Chickens (386)	0.8	5.7	[3.6 - 5.9]										88.9	4.7	0.8	0.3	5.4			
		HACCP (990)	0.1	7.3	[5.7 - 7.3]										88.7	3.9	0.1	0.2	7.1			
		ช ฟู Retail Ground Turkey (391)	0.0	22.8	[18.7 - 22.9]										72.1	5.1			22.8			
		Retail Ground Beef (271)	0.0	2.2	[0.8 - 2.5]										97.4	0.4			2.2			
		Retail Pork Chops (161)	0.0	5.0	[2.2 - 5.4]										91.9	3.1		0.6	4.4			
	Streptomycin	κ Retail Chickens (386)	N/A	39.6	[34.7 - 39.8]												60.4	17.4	22.3			
		은 HACCЬ (880)	N/A	42.8	[39.7 - 42.9]												57.2	20.8	22.0			
		ທຸ້ ຊື່ Retail Ground Turkey (391)	N/A	67.0	[62.1 - 67.1]												33.0	21.0	46.0			
		Retail Ground Beef (271)	N/A	10.0	[6.7 - 10.2]												90.0	4.8	5.2			
		Retail Pork Chops (161)	N/A	14.9	[9.8 - 15.3]												85.1	7.5	7.5			

<sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding.

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

Table 84b. Distribution of MICs and Occurrence of Resistance among *E. coli* Isolates, 2012

		Isolate Source			· ·						Distr			ICs (µg/ı	ml) <sup>4</sup>						
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R²	[95% CI] <sup>3</sup>	0.015	.03 0.0	0.12	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin-Clavulanic Acid	Retail Chickens (386)	1.6	7.8	[5.3 - 7.9]						2.6	18.4	58.6	11.1	1.6	4.2	3.6				
		는 HACCP (990)	1.1	9.0	[7.3 - 9.1]						4.8	32.5	42.7	9.8	1.1	6.3	2.7				
		Retail Ground Turkey (391)	14.8	11.8	[8.7 - 11.9]						1.3	10.0	32.5	29.7	14.8	5.6	6.1				
		Retail Ground Beef (271)	0.0	1.5	[0.4 - 1.7]						3.7	22.1	64.2	8.5		1.1	0.4				
		e Retail Pork Chops (161)	1.2	3.1	[1.0 - 3.5]						1.9	20.5	62.1	11.2	1.2	1.2	1.9				
Cephems	Cefoxitin	Retail Chickens (386)	1.0	7.8	[5.3 - 7.9]						0.3	8.6	65.8	16.6	1.0	1.0	6.7				
		은 HACCP (990)	1.0	9.2	[7.5 - 9.3]					0.2	1.1	26.1	51.7	10.7	1.0	3.3	5.9				
		প্র Retail Ground Turkey (391)	1.3	11.3	[8.3 - 11.4]							9.5	62.7	15.4	1.3	1.8	9.5				
		Retail Ground Beef (271)	1.1	1.8	[0.6 - 2.1]					0.4	1.9	19.2	66.1	9.6	1.1	0.7	1.1				
		Retail Pork Chops (161)	3.1	1.9	[0.4 - 2.3]							16.2	70.2	8.7	3.1	0.6	1.2				
	Ceftiofur	Retail Chickens (386)	0.3	7.5	[5.1 - 7.7]				23.6	66.6	1.8	0.3	0.3	2.3	5.2						
		은 HACCP (990)	0.9	7.6	[6.0 - 7.6]			4.0	47.4	38.4	1.4	0.3	0.9	5.1	2.5						
		ช Retail Ground Turkey (391)	0.5	9.2	[6.5 - 9.4]			0.3	18.7	65.7	4.6	1.0	0.5	1.3	7.9						
		Retail Ground Beef (271)	0.0	0.0	[0.0 - 0.3]			5.5	31.7	59.8	2.6	0.4									
		Retail Pork Chops (161)	0.0	1.2	[0.2 - 1.7]				33.5	62.1	2.5	0.6		0.6	0.6						
	Ceftriaxone	κ Retail Chickens (386)	0.3	7.8	[5.3 - 7.9]				91.5	0.3	0.3	0.3		0.8	5.2	1.3	0.3	0.3			
		Ö HACCP (990)	0.1	8.8	[7.1 - 8.9]				90.1	0.5	0.5	0.1	0.5	3.8	4.1	0.3					
		ହ Retail Ground Turkey (391)	0.8	9.7	[7.0 - 9.9]				88.0	0.3	1.3	0.8		1.3	5.4	2.8	0.3				
		Retail Ground Beef (271)	0.4	0.0	[0.0 - 0.3]				99.3		0.4	0.4									
		Retail Pork Chops (161)	0.6	1.2	[0.2 - 1.7]				97.5	0.6		0.6		0.6	0.6						

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates

Table 84c. Distribution of MICs and Occurrence of Resistance among *E. coli* Isolates, 2012

		Isolate Source										Distr			ICs (µg/							
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R²	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Folate Pathway Inhibitors	Sulfisoxazole	Retail Chickens (386)	N/A	37.8	[33.0 - 38.0]											45.3	15.5	1.3			37.8	
		Ö HACCP (990)	N/A	47.6	[44.4 - 47.6]											45.4	6.1	0.7		0.3	47.6	
		ง อื่อ Retail Ground Turkey (391)	N/A	56.8	[51.7 - 56.9]											30.2	11.3	1.8			56.8	
		Retail Ground Beef (271)	N/A	7.4	[4.6 - 7.6]											74.5	17.3	0.7			7.4	
		Retail Pork Chops (161)	N/A	6.8	[3.5 - 7.2]											76.4	15.5	1.2			6.8	
	Trimethoprim-Sulfamethoxazole	κ Retail Chickens (386)	N/A	2.6	[1.2 - 2.8]				80.1	9.8	5.7	1.8			2.6							
		은 HACCP (990)	N/A	6.5	[5.0 - 6.5]				74.5	9.7	4.9	3.4	0.9		6.5							
		ຶ່ວ ອ້ອ Retail Ground Turkey (391)	N/A	6.1	[4.0 - 6.3]				72.4	14.1	7.2	0.3			6.1							
		Retail Ground Beef (271)	N/A	0.4	[0.0 - 0.6]				98.2	1.5					0.4							
		Retail Pork Chops (161)	N/A	1.9	[0.4 - 2.3]				93.2	3.7	0.6		0.6		1.9							
Macrolides	Azithromycin	κ Retail Chickens (386)	N/A	0.0	[0.0 - 0.2]							1.0	17.6	74.1	7.0	0.3						
		중 HACCP (990)	N/A	0.5	[0.2 - 0.6]						0.4	2.5	46.2	47.8	2.4	0.2	0.5					
		Retail Ground Turkey (391)	N/A	0.0	[0.0 - 0.2]						0.5	2.8	25.6	65.5	4.9	0.8						
		Retail Ground Beef (271)	N/A	0.0	[0.0 - 0.3]					0.4	0.8	1.5	11.4	70.1	15.5	0.4						
		Retail Pork Chops (161)	N/A	0.0	[0.0 - 0.4]								16.2	62.1	20.5	1.2						
Penicillins	Ampicillin	Retail Chickens (386)	N/A	0.3	[0.0 - 0.4]								1.6	43.3	53.1	1.8		0.3				
		은 HACCP (990)	N/A	17.7	[15.3 - 17.7]							15.5	50.2	16.1	0.4	0.2	0.6	17.1				
		אל א Retail Ground Turkey (391)	N/A	55.5	[50.4 - 55.6]								2.3	39.4	51.2	1.3	0.3	5.6				
		Retail Ground Beef (271)	N/A	2.6	[1.0 - 2.8]								2.2	36.2	57.9	2.6		1.1				
		Retail Pork Chops (161)	N/A	13.0	[8.3 - 13.4]								2.5	25.5	64.0	4.4	1.9	1.9				

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates

Table 84d. Distribution of MICs and Occurrence of Resistance among E. coli Isolates, 2012

		Isolate Source			,									(%) of M	ICs (µg/ı							
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Phenicols	Chloramphenicol	Retail Chickens (386)	1.8	0.3	[0.0 - 0.4]								1.6	43.3	53.1	1.8		0.3				
		등 HACCP (990)	0.6	1.9	[1.2 - 2.0]								10.5	67.0	20.0	0.6		1.9				
		Retail Ground Turkey (391)	1.3	5.9	[3.8 - 6.0]								2.3	39.4	51.2	1.3	0.3	5.6				
		ਦੂ ਇ Retail Ground Beef (271) ਹ	2.6	1.1	[0.2 - 1.4]								2.2	36.2	57.9	2.6		1.1				
		Retail Pork Chops (161)	4.4	3.7	[1.4 - 4.1]								2.5	25.5	64.0	4.4	1.9	1.9				
Quinolones	Ciprofloxacin	α Retail Chickens (386)	1.6	0.0	[0.0 - 0.2]	93.5	4.4	0.5	0.3	1.0	0.3											
		은 HACCP (990)	1.9	0.5	[0.2 - 0.6]	96.9	0.5	0.2	0.8	1.0	0.1				0.5							
		တ် Retail Ground Turkey (391)	1.5	0.3	[0.0 - 0.4]	91.6	6.7			1.3	0.3				0.3							
		Retail Ground Beef (271)	1.1	0.0	[0.0 - 0.3]	97.8	0.7	0.4		0.7	0.4											
		Retail Pork Chops (161)	1.2	0.0	[0.0 - 0.4]	93.2	5.0	0.6	0.6		0.6											
	Nalidixic Acid	κα Retail Chickens (386)	N/A	1.8	[0.7 - 2.0]							14.8	67.4	15.8	0.3		0.3	1.6				
		등 HACCP (990)	N/A	2.4	[1.6 - 2.5]						1.1	32.8	60.0	3.5		0.1	0.9	1.5				
		Retail Chickens (386)	N/A	1.8	[0.7 - 2.0]						0.3	11.0	69.3	17.1	0.5		0.3	1.5				
		Retail Ground Beef (271)	N/A	1.5	[0.4 - 1.7]						0.4	8.9	67.9	21.0	0.4		0.7	0.7				
		Retail Pork Chops (161)	N/A	0.0	[0.0 - 0.4]						1.2	11.2	62.1	24.8		0.6						
Tetracyclines	Tetracycline	Retail Chickens (386)	1.6	39.4	[34.5 - 39.5]									59.1	1.6	0.3	2.9	36.3				
		다. HACCP (990)	1.4	45.4	[42.2 - 45.4]									53.2	1.4	1.7	11.8	31.8				
		Retail Chickens (386)	0.8	77.2	[72.8 - 77.3]									22.0	0.8	0.3	4.1	72.9				
		Retail Ground Beef (271)	3.0	22.1	[17.3 - 22.4]									74.9	3.0	0.7	0.7	20.7				
		Retail Pork Chops (161)	0.0	39.1	[31.5 - 39.5]									60.9		1.9	3.1	34.2				

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding.

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations.

#### **MIC Distributions**

Table 85a, Distribution of MICs and Occurrence of Resistance among E. coli Isolates, 2013

		nce of Resistance amo													IICs (µg/							_
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	. 8	16	32	64	128	256	512	1024
Aminoglycosides	Gentamicin	Retail Chickens (360)	3.9	30.8	[26.1 - 35.9]					0.8	25.6	35.3	2.5	1.1	3.9	8.1	22.8					
		Cecal (48)	6.3	35.4	[22.2 - 50.5]						18.8	37.5	2.1		6.3	6.3	29.2					
		g Retail Ground Turkey (374)	2.4	27.0	[22.6 - 31.8]					0.3	23.3	44.9	2.1		2.4	7.2	19.8					
		를 Cecal (29)	3.5	37.9	[20.7 - 57.7]						24.1	34.5			3.5	20.7	17.2					
		Retail Ground Beef (227)	0.4	0.0	[0.0 - 1.6]						33.9	59.0	6.6		0.4							
		© Cecal (Beef) (293)	0.0	0.3	[0.0 - 1.9]					0.7	48.8	48.1	2.1		0.1	0.3						
		රි Cecal (Dairy) (256)	0.0	0.0	[0.0 - 1.4]						47.7	49.2	3.1									
		Retail Pork Chops (208)	1											0.5		0.5	0.5					
		Cecal (Market Hogs) (118)	0.0	1.0 0.8	[0.1 - 3.4]					0.9	35.1 38.1	59.6 54.2	3.9 5.1	0.5		0.5	0.5					
		S Cecal (Sows) (120)	0.0	0.0	[0.0 - 4.6]					0.9	40.8	54.2	4.2	0.8		0.9						
		Retail Chickens (271)									40.0	04.Z	7.2	0.0				1				
	Kanamycin <sup>5</sup>	Cecal (48)	0.7	10.3	[7.0 - 14.6]										84.1	4.8	0.7		10.3			
			0.0	4.2	[0.5 - 14.3]										83.3	12.5			4.2			
		Retail Ground Turkey (273)	0.4	24.2	[19.2 - 29.7]										74.7	0.7	0.4		24.2			
			0.0	17.2	[5.8 - 35.8]										82.8				17.2			
		Retail Ground Beef (166)	0.0	1.2	[0.1 - 4.3]										98.9				1.2			
		Cecal (Beef) (293)	0.0	1.4	[0.4 - 3.5]										98.6				1.4			
		Cecal (Dairy) (256)	0.0	1.6	[0.4 - 4.0]										98.4				1.6			
		Retail Pork Chops (144)	0.0	5.6	[2.4 - 10.7]										94.4				5.6			
		. Cecal (Market Hogs) (118)	0.0	11.0	[6.0 - 18.1]										89.0				11.0			
		Cecal (Sows) (120)	0.0	6.7	[2.9 - 12.7]										93.3				6.7			
	Streptomycin <sup>6</sup>	Retail Chickens (360)	N/A	38.9	[33.8 - 44.1]												61.1	16.7	22.2			
		ੁੱਚ Cecal (48)	N/A	31.3	[18.7 - 46.3]												68.8	8.3	22.9			
		Retail Ground Turkey (373)	N/A	54.2	[48.9 - 59.3]												45.8	20.6	33.5			
		는 Cecal (29)	N/A	55.2	[35.7 - 73.6]												44.8	17.2	37.9			
		Retail Ground Beef (227)	N/A	8.4	[5.1 - 12.8]												91.6	2.2	6.2			
		Cecal (Beef) (293)	N/A	8.9	[5.9 - 12.7]												91.1	3.8	5.1			
		Cecal (Dairy) (256)	N/A	6.3	[3.6 - 10.0]												93.7	2.4	3.9			
		Retail Pork Chops (208)	N/A	17.8	[12.8 - 23.7]												82.2	8.7	9.1			
		Cecal (Market Hogs) (118)	N/A	18.6	[12.0 - 25.7]												81.4	9.3	9.3			
		ຶ້ດ Cecal (Sows) (120)	N/A	23.3	[16.1 - 31.9]												76.7	10	13.33			
			11//	20.0	[10.1 - 31.9]												10.1	.0	10.00			

<sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

 $<sup>^3</sup>$  95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup>The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

<sup>&</sup>lt;sup>5</sup> Kanamycin results are unavailable for all retail meat isolates due to a change in the panel used for testing

<sup>&</sup>lt;sup>6</sup> Streptomycin results are unavailable for one retail meat turkey isolate

Table 85b. Distribution of MICs and Occurrence of Resistance among E. coli Isolates, 2013

β-Lactam/β-Lactamase Inhibitor Combinations			%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015 0.03 0.06	0.125	0.25	0.50	11	2	4	8	16	32	64	128	256 5	1024
	Amoxicillin-Clavulanic Acid	Retail Chickens (360)	1.7	5.6	[3.4 - 8.4]					3.3	26.9	45.6	16.9	1.7	2.8	2.8			
		ତ୍ର ଓ Cecal (48)	0.0	2.1	[0.1 - 11.1]					8.3	27.1	52.1	10.4		2.1				
		Retail Ground Turkey (374)	11.0	8.8	[6.2 - 12.2]					2.7	9.9	34.5	33.2	11.0	6.4	2.4			
		E Cecal (29)	10.3	6.9	[0.8 - 22.8]						10.3	20.7	51.7	10.3	6.9				
		Retail Ground Beef (227)	0.0	1.8	[0.5 - 4.5]					4.0	26.0	59.9	8.4		1.8				
		Tecal (Beef) (293)	0.0	0.0	[0.0 - 1.3]					4.4	12.3	69.3	14.0						
		Cecal (Dairy) (256)	0.0	1.6	[0.4 - 4.0]					2.3	15.6	66.4	14.1		0.8	8.0			
		Retail Pork Chops (208)	1.0	1.0	[0.1 - 3.4]						26.4	57.7	13.9	1.0	1.0				
		Cecal (Market Hogs) (118)	1.7	8.0	[0.0 - 4.6]					3.4	20.3	56.8	17.0	1.7	0.9				
		Cecal (Sows) (120)	0.8	8.0	[0.0 - 4.6]					2.5	19.2	56.7	20.0	0.8	0.8				
Cephems	Cefoxitin	Retail Chickens (360)	0.3	5.0	[3.0 - 7.8]				0.3	0.3	11.7	69.7	12.8	0.3	1.9	3.1			
		5 Cecal (48)	2.1	2.1	[0.1 - 11.1]					4.2	12.5	62.5	16.7	2.1		2.1			
		Retail Ground Turkey (374)	1.1	7.8	[5.3 - 10.9]						14.7	66.3	10.2	1.1	2.1	5.6			
		F Cecal (29)	3.5	3.4	[0.1 - 17.8]						13.8	65.5	13.8	3.5		3.5			
		Retail Ground Beef (227)	0.9	1.3	[0.3 - 3.8]				0.3	2.2	31.3	56.0	8.4	0.9	0.4	0.9			
		Cecal (Beef) (293) Cecal (Dairy) (256)	0.4	0.0 1.2	[0.0 - 1.3]				0.3	1.4	19.5 18.4	63.8 69.9	13.7	0.4	0.4	0.8			
		Retail Pork Chops (208)	0.0	1.0	[0.1 - 3.4]					0.5	20.7	71.2	6.7		0.5	0.5			
		© Cecal (Market Hogs) (118)	0.0	0.8	[0.0 - 4.6]					0.5	15.3	72.9	11.0		0.5	0.9			
		ທົ Cecal (Sows) (120)	0.8	0.8	[0.0 - 4.6]						20.0	71.7	6.7	0.8		0.8			
	Ceftiofur	Retail Chickens (360)	0.0	4.4	[2.6 - 7.1]		2.2	27.5	63.1	2.2	0.6		2.2	2.2					
		ਨੂੰ Cecal (48)	0.0	2.1	[0.1 - 11.1]		4.2	35.4	56.3	2.1			2.1						
		Retail Ground Turkey (374)	0.3	6.4	[4.2 - 9.4]		1.3	30.0	58.6	2.4	1.1	0.3	1.6	4.8					
		Cecal (29)	0.0	3.4	[0.1 - 17.8]			17.2	75.9	3.5				3.5					
		Retail Ground Beef (227)	0.4	1.8	[0.5 - 4.5]		6.2	40.5	50.7	0.4		0.4	0.4	1.3					
		Cecal (Beef) (293)	0.0	0.0	[0.0 - 1.3]		2.7	30.4	65.2	1.7									
		Cecal (Dairy) (256)	0.0	1.2	[0.2 - 3.4]		2.0	26.2	68.8	1.6	0.4		8.0	0.4					
		Retail Pork Chops (208)	0.0	1.4	[0.3 - 4.2]		2.4	43.8	51.0	1.4			1.0	0.5					
		Cecal (Market Hogs) (118)	0.0	8.0	[0.0 - 4.6]		0.9	33.9	61.9	2.5			0.9						
		Cecal (Sows) (120)	0.0	8.0	[0.0 - 4.6]		0.8	40.8	55.8	1.7				8.0					
	Ceftriaxone	Retail Chickens (360)	0.3	4.4	[2.6 - 7.1]			94.4	0.3	0.6	0.3	0.3	1.1	2.5	0.3	0.3			
		Ö Cecal (48)	0.0	2.1	[0.1 - 11.1]			97.9						2.1					
		Retail Ground Turkey (374)	0.5	6.7	[4.4 - 9.7]			91.4	0.8 3.5	0.5 3.5	0.5		1.3	3.2	1.9	0.3			
		F Cecal (29)	0.0	3.4	[0.1 - 17.8]			89.7	3.5	3.5					3.5				
		Retail Ground Beef (227)	0.0	2.2	[0.7 - 5.1]			97.8 100.0					1.8			0.4			
		Cecal (Beer) (293) Cecal (Dairy) (256)	0.0	0.0 1.6	[0.0 - 1.3]			98.4					0.8	0.8					
		Retail Pork Chops (208)		1.4				98.6					1.0			0.5			
		Retail Pork Chops (208)  Cecal (Market Hogs) (118)	0.0	0.8	[0.3 - 4.2]			99.2					1.0	0.9		0.0			
		Cecal (Sows) (120)	0.0	0.8	[0.0 - 4.6]			99.2						0.8					

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding.

 $<sup>^3</sup>$  95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

Table 85c. Distribution of MICs and Occurrence of Resistance among E. coli Isolates, 2013

14310 0001 210111041101		Isolate Source	. <u></u>		<u></u>						Distri	bution (	%) of M	ICs (ua/	/ml) <sup>4</sup>						$\neg$
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015 0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Folate Pathway Inhibitors	Sulfisoxazole	Retail Chickens (360)	N/A	39.2	[34.1 - 44.4]										44.4	15.6	0.6		0.3	39.2	
		ទី Cecal (48)	N/A	37.5	[24.0 - 52.6]										47.9	12.5			2.1	37.5	
		ο Retail Ground Turkey (374)	N/A	50.0	[44.8 - 55.2]										33.4	15.2	1.3			50.0	
		E Cecal (29)	N/A	55.2	[35.7 - 73.6]										31.0	10.3	3.5			55.2	
		Retail Ground Beef (227)	N/A	7.9	[4.8 - 12.2]										78.0	14.1				7.9	
		DECEMBER (Beef) (293)	N/A	9.2	[6.2 - 13.1]										75.8	15.0				9.2	
		Cecal (Dairy) (256)	N/A	5.5	[3.0 - 9.0]										80.9	13.3	0.4			5.5	
		Retail Pork Chops (208)	N/A	10.1	[6.4 - 15.0]										70.2	19.2	0.5			10.1	
		Cecal (Market Hogs) (118)	N/A	19.5	[12.8 - 27.8]										66.1	14.4				19.5	
		Cecal (Sows) (120)	N/A	13.3	[7.8 - 20.7]										66.7	20.0				13.3	
	Trimethoprim-Sulfamethoxazole	ହ ୬ Retail Chickens (360)	N/A	3.1	[1.5 - 5.4]			81.1	9.4	4.4	1.1	0.8	3.1								
		O Cecal (48)	N/A	4.2	[0.5 - 14.3]			75.0	16.7		4.2		4.2								
		Retail Ground Turkey (374)	N/A	3.7	[2.1 - 6.2]			77.3	15.5	2.9	0.3	0.3	0.3	3.5							
		E Cecal (29)	N/A	10.3	[2.2 - 27.4]			75.9	10.3	3.5				10.3							
		Retail Ground Beef (227)	N/A	1.8	[0.5 - 4.5]			96.0	0.9	1.3			1.8								
		E Cecal (Beef) (293)	N/A	0.0	[0.0 - 1.3]			93.9	5.1	1.0											
		Cecal (Dairy) (256)	N/A	0.0	[0.0 - 1.4]			96.5	3.1	0.4											
		Retail Pork Chops (208)	N/A	1.4	[0.3 - 4.2]			91.8	4.8	1.4		0.5		1.4							
		Cecal (Market Hogs) (118)	N/A	3.4	[0.9 - 8.5]			87.3	7.6	1.7				3.4							
		Cecal (Sows) (120)	N/A	1.7	[0.2 - 5.9]			88.3	9.2	8.0			1.7								
Macrolides	Azithromycin	Retail Chickens (360)	N/A	0.0	[0.0 - 1.0]						0.3	18.3	69.2	11.9	0.3						
		5 Cecal (48)	N/A	0.0	[0.0 - 7.4]							20.8	64.6	14.6							
		∞	N/A	0.0	[0.0 - 1.0]						2.7	30.5	61.2	5.6							
		P Cecal (29)	N/A	0.0	[0.0 - 11.9]							34.5	62.1	3.5							
		Retail Ground Beef (227)	N/A	0.9	[0.1 - 3.1]					0.4	0.9	11.5	68.7	17.6		0.9					
		Cecal (Beef) (293)	N/A	0.0	[0.0 - 1.3]				0.3		1.0	13.3	71.7	13.7							
		Cecal (Dairy) (256)	N/A	0.0	[0.0 - 1.4]						1.6	8.2	79.7	10.6							
		Retail Pork Chops (208)	N/A	0.0	[0.0 - 1.8]					0.5	1.4	9.6	75.5	13.0							
		Cecal (Market Hogs) (118)	N/A	0.0	[0.0 - 3.1]						0.9	15.3	74.6	9.3							
		Cecal (Sows) (120)	N/A	0.0	[0.0 - 3.0]						8.0	20.0	74.2	5.0	1						
Penicillins	Ampicillin	Retail Chickens (360)	N/A	20.8	[16.8 - 25.4]						9.7	40.3	28.6	0.3	0.3	20.8					
		Cecal (48)	N/A	10.4	[3.5 - 22.7]						12.5	43.8	33.3				10.4				
		Retail Ground Turkey (374)	N/A	54.0	[48.8 - 59.1]						4.8	25.9	15.0	0.3			54.0				
		- Cecal (29)	N/A	69.0	[49.2 - 84.7]						10.3	6.9	13.8				69.0				
		Retail Ground Beef (227) Φ	N/A	4.8	[2.4 - 8.5]						11.0	49.8	34.4				4.9				
		Cecal (Beef) (293)	N/A	3.8	[1.9 - 6.6]						7.2	42.3	45.7	0.7	0.3	0.3	3.4				
		Cecal (Dairy) (256)	N/A	3.1	[1.4 - 6.1]						8.2	37.5	50.4	8.0			3.1				
		Retail Pork Chops (208)	N/A	11.5	[7.5 - 16.7]						6.3	51.4	28.9	1.9			11.5				
		Cecal (Market Hogs) (118)	N/A	15.3	[9.3 - 23.0]						6.8	35.6					15.3				
		Cecal (Sows) (120)	N/A	22.5	[15.4 - 31.0]						10.0	37.5	30.0				22.5				

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding

 $<sup>^3</sup>$  95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

Table 85d. Distribution of MICs and Occurrence of Resistance among E. coli Isolates, 2013

	n of MICs and Occurrer	Isolate Source							0.405	2.05	0.50		ibution (						400	050	F40	1001
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	54.0	8	16	32	64	128	256	512	1024
Phenicols	Chloramphenicol	Retail Chickens (360)	0.3 2.1	0.0	[0.6 - 3.6]								1.9 6.3	51.9 29.2	44.2	0.3	0.3	1.4				
			ŀ												62.5	2.1						
		Retail Ground Turkey (374)	0.3 3.5	5.3 0.0	[3.3 - 8.1]								5.4	49.7 37.9	39.3 58.6	0.3 3.5		5.4				
		F Cecal (29)	ŀ		[0.0 - 11.9]																	
		Retail Ground Beef (227)	0.9	4.0	[1.8 - 7.4]								5.3	31.7	58.2	0.9		4.0				
		Cecal (Beef) (293) Cecal (Dairy) (256)	1.2	3.8 2.3	[1.9 - 6.6]								0.8	32.4	59.0 65.6	1.2		3.8 2.3				
			ŀ																			
		Retail Pork Chops (208)	1.9 2.5	2.4 5.1	[0.8 - 5.5]								1.9	38.9 25.4	54.8 65.3	1.9 2.5	0.5 4.2	0.9				
		Cecal (Sows) (120)	0.0	5.8	[2.4 - 11.6]								1.7	30.0	62.5	2.0	4.2	1.7				
Quinolones	Ciprofloxacin	β Retail Chickens (360)	2.2	0.6	[0.1 - 2.0]	92.5	4.7		0.3	1.7	0.3				0.6		<u>II</u>					
Quinoionioo	O.p. C. I.p. I.p	호 등 Cecal (48)	2.1	0.0	[0.0 - 7.4]	93.8	2.1	2.1	2.1													
		o Retail Ground Turkey (374)	1.6	0.3	[0.0 - 1.5]	94.1	4.0		0.3	1.3				0.3								
		포 는 Cecal (29)	0.0	0.0	[0.0 - 11.9]	96.6	3.5															
		Retail Ground Beef (227)	0.4	0.0	[0.0 - 1.6]	98.2	1.3			0.4												
		© Cecal (Beef) (293)	0.0	0.0	[0.0 - 1.3]	98.6	1.4															
		Cecal (Dairy) (256)	0.4	0.0	[0.0 - 1.4]	98.1	1.6				0.4											
		Retail Pork Chops (208)	0.0	0.0	[0.0 - 1.8]	98.6	1.4															
		Cecal (Market Hogs) (118)	2.5	1.7	[0.2 - 6.0]	94.1	1.7				2.5	0.9			0.9							
		Cecal (Sows) (120)	1.7	0.0	[0.0 - 3.0]	97.5	0.8			1.7												
	Nalidixic Acid	Retail Chickens (360)	N/A	2.5	[1.1 - 4.7]						1.4	16.1	69.2	10.3	0.3	0.3	0.3	2.2				
		ਨ Cecal (48)	N/A	2.1	[0.1 - 11.1]						2.1	14.6	60.4	18.8		2.1	2.1					
		Retail Chickens (360)	N/A	1.9	[0.8 - 3.8]						0.3	14.7	74.9	8.3			0.3	1.6				
		은 Cecal (48)	N/A	0.0	[0.0 - 11.9]							13.8	75.9	10.3								
		Retail Ground Beef (227)	N/A	0.4	[0.0 - 2.4]							13.2	78.0	8.4				0.4				
		Cecal (Beef) (293)	N/A	0.0	[0.0 - 1.3]						0.7	4.8	78.8	15.4	0.3							
		Cecal (Dairy) (256)	N/A	0.0	[0.0 - 1.4]						0.4	4.7	77.3	17.2		0.4						
		Retail Pork Chops (208)	N/A	0.0	[0.0 - 1.8]						1.4	13.0	74.1	11.5	0.5			4.7				
		Cecal (Market Hogs) (118)  Cecal (Sows) (120)	N/A N/A	1.7 0.8	[0.2 - 6.0]							5.1 7.5	72.0 76.7	18.6	2.5	0.8		1.7 0.83				
Tetracyclines	Tetracycline	g Retail Chickens (360)	0.6	43.3	[38.1 - 48.6]									56.7		0.6	3.1	39.7				
renacycinies	renacycline	5 Cecal (48)	0.0	29.2	[17.0 - 44.1]									68.8	2.1	0.0	2.1	27.1				
		o Retail Chickens (360)	1.1	74.3	[69.6 - 78.7]									24.6	1.1	1.1	5.6	67.7				
		Cecal (48)	0.0	69.0	[49.2 - 84.7]									31.0				69.0				
		Retail Ground Beef (227)	2.2	22.5	[17.2 - 28.5]									72.7	4.9	2.2	3.1	17.2				
		© Cecal (Beef) (293)	1.0	25.9	[21.0 - 31.4]									70.0	4.1	1.0	1.7	23.2				
		Cecal (Dairy) (256)	0.8	0.4	[0.0 - 2.2]									80.1	3.1	0.8	0.4	15.6				
		Retail Pork Chops (208)	1.4	51.4	[44.4 - 58.4]									48.1	0.5	1.4	1.9	48.1				
		Cecal (Market Hogs) (118)	0.0	63.6	[54.2 - 72.2]									34.8	1.7		5.1	58.5				
		Cecal (Sows) (120)	0.8	70.8	[61.8 - 78.8]									29.2		0.8	5.0	65				

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s, to the right of the double vertical bars, are due to rounding.

 $<sup>^3</sup>$  95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for susceptibility, while double vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.

Year				2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		sens	Retail Chickens	282	396	400	393	418	299	306	315	357	341	386	360
		Chickens	HACCP <sup>1</sup> Cecal	2100	1365	1697	2232	1357	1510	986	877	941	614	990	48
		_	Retail Ground Turkey	304	333	376	396	388	315	300	306	369	368	391	374
		Turkeys	Cecal		000	0.0	000	000	0.0	000	000	000	000	001	29
		Ф	Retail Ground Beef	295	311	338	316	295	256	250	247	269	215	271	227
		Cattle	Cecal (Beef)												293
		-	Cecal (Dairy)												256
		Swine	Retail Pork Chops Cecal (Market Hogs)	184	218	232	205	182	152	146	147	183	146	161	208 118
		Ó	Cecal (Sows)												120
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class	Breakpoint) Gentamicin	-	Source	23.1%	29.3%	30.0%	37.7%	37.3%	34.4%	34.0%	34.3%	31.9%	38.4%	30.6%	30.8%
	(MIC ≥ 16 µg/ml)	sus	Retail Chickens	65	116	120	148	156	103	104	108	114	131	118	111
		Chickens	HACCP	38.0% 799	38.8% 530	39.1% 663	36.7% 819	33.1% 449	38.0% 574	44.5% 439	43.3% 380	43.0% 405	42.8% 263	42.1% 417	
			Cecal												35.4% 17
		ske	Retail Ground Turkey	27.0% 82	29.7% 99	29.3% 110	27.5% 109	29.6% 115	27.0% 85	37.0% 111	37.9% 116	24.9% 92	32.6% 120	40.9% 160	27.0% 101
		Turkeys	Cecal	02	33	110	109	113	- 00		110	32	120	100	37.9%
			Retail Ground Beef	0.3%	1.0%	0.6%	0.0%	4.1%	0.0%	2.0%	0.8%	0.4%	0.5%	0.7%	0.0%
		Cattle	Cecal (Beef)	1	3	2	0	12	0	5	2	11	1	2	0.3%
		င္မ													0.0%
		<u> </u>	Cecal (Dairy)	1.1%	1.4%	1.3%	0.0%	1.1%	1.3%	1.4%	4.1%	2.7%	0.7%	0.6%	0.0%
		m	Retail Pork Chops	1.1%	1.4%	1.3%	0.0%	1.1%	1.3%	1.4%	4.1%	5	1	1	2
		Swine	Cecal (Market Hogs)												0.8% 1
			Cecal (Sows)												0.0%
	Kanamycin² (MIC ≥ 64 μg/ml)	,,	Retail Chickens	6.0% 17	6.8% 27	6.8% 27	7.1% 28	11.5% 48	9.0% 27	6.9% 21	5.4% 17	6.2% 22	5.6% 19	5.7% 22	7.8% 28
	(Wile 2 o4 pg/m)	Chickens	HACCP	11.6%	10.3%	11.5%	10.3%	9.1%	7.7%	10.2%	7.9%	6.4%	5.7%	7.3%	20
		ş	Cecal	243	140	196	231	123	117	101	69	60	35	72	4.2%
				13.2%	16.8%	16.0%	11.4%	14.7%	15.6%	19.0%	20.6%	21.4%	24.7%	22.8%	2 17.6%
		Turkeys	Retail Ground Turkey	40	56	60	45	57	49	57	63	79	91	89	66 17.2%
		Ĕ	Cecal		2.20			. =			2.00/	0.704		2.001	5
			Retail Ground Beef	2.4% 7	2.9% 9	2.4% 8	0.6% 2	4.7% 14	1.6% 4	4.0% 10	2.0% 5	3.7% 10	1.4% 3	2.2% 6	0.9%
		Cattle	Cecal (Beef)												1.4%
			Cecal (Dairy)												1.6% 4
			Retail Pork Chops	5.4%	8.7%	8.2%	7.3%	6.0%	4.6%	6.2%	6.1%	7.7%	1.4%	5.0%	3.8%
		Swine	Cecal (Market Hogs)	10	19	19	15	11	7	9	9	14	2	8	11.0%
		Ś	Cecal (Sows)												13 6.7%
	Streptomycin <sup>3</sup>		` ′	49.3%	56.1%	56.8%	50.6%	48.1%	46.8%	43.8%	38.1%	39.2%	43.4%	39.6%	8 38.9%
	(MIC ≥ 64 µg/ml)	kens	Retail Chickens	139	222	227	199	201 49.5%	140 47.0%	134	120 49.8%	140 49.1%	148	153 42.8%	140
		Chicke	HACCP	1368	877	64.1% 1088	1295	49.5% 672	710	538	49.8%	49.1%	312	42.8% 424	
		U	Cecal												31.3% 15
		eys	Retail Ground Turkey	57.6% 175	54.7% 182	49.2% 185	43.4% 172	43.8% 170	44.8% 141	57.3% 172	57.5% 176	47.7% 176	60.3% 222	67.0% 262	54.0% 202
		Turkeys	Cecal							.,,_					55.2%
			Retail Ground Beef	9.5%	9.0%	11.8%	5.4%	14.2%	6.3%	10.4%	8.1%	9.3%	6.5%	10.0%	8.4%
		Cattle	Cecal (Beef)	28	28	40	17	42	16	26	20	25	14	27	19 8.9%
		Ca													26 6.3%
			Cecal (Dairy)	22.3%	19.7%	21.1%	13.2%	13.7%	13.8%	19.9%	19.7%	19.7%	15.1%	14.9%	16
		Φ	Retail Pork Chops	22.3% 41	19.7%	21.1% 49	13.2%	25	13.8%	19.9%	19.7%	19.7%	15.1%	14.9%	37
		Swine	Cecal (Market Hogs)												18.6% 22
			Cecal (Sows)												23.3% 28
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin- Clavulanic Acid	s	Retail Chickens	12.1% 34	13.6% 54	10.0% 40	12.2% 48	11.5% 48	7.4% 22	11.8% 36	13.3% 42	6.7% 24	14.1% 48	7.8% 30	5.6% 20
Ditor Joinbillations	(MIC ≥ 32 / 16 µg/ml)	Chickens	HACCP	10.9%	11.1%	8.8%	10.6%	16.0%	11.2%	13.7%	12.4%	12.4%	9.4%	9.0%	20
		ج و	Cecal	229	151	149	236	217	169	135	109	117	58	89	2.1%
		s		5.6%	3.0%	5.3%	3.8%	6.7%	6.3%	8.3%	9.8%	10.0%	13.0%	11.8%	1 8.8%
		Turkeys	Retail Ground Turkey	17	10	20	15	26	20	25	30	37	48	46	33 6.9%
		ĭ	Cecal	0.001	0.001	0.001	4.001	0.401	0.001	0.401	4.001	4.401	0.501	A 501	2
			Retail Ground Beef	2.0% 6	2.3% 7	3.9% 13	1.3% 4	2.4% 7	0.8% 2	2.4% 6	1.6% 4	1.1% 3	0.5% 1	1.5% 4	1.8% 4
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)												1.6%
			Retail Pork Chops	5.4%	5.1%	5.6%	2.9%	2.2%	0.7%	3.4%	6.8%	2.2%	0.0%	3.1%	1.0%
		Swine	Cecal (Market Hogs)	10	11	13	6	4	1	5	10	4	0	5	0.8%
		Sw	Cecal (Narket Hogs)  Cecal (Sows)												1 0.8%
															1

In 2013, chicken carcass rinsates were not sampled for E. coli
 Kanamycin results are unavailable for all retail meat isolates due to a change in the panel used for testing
 Streptomycin results are unavailable for one 2013 retail meat turkey isolate

Table 86b. Antimicrobial Resistance among E. coli Isolates, 2002-2013

Year	robial Resistance a			2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Test	ted	Chickens	Retail Chickens HACCP <sup>1</sup> Cecal	282 2100	396 1365	400 1697	393 2232	418 1357	299 1510	306 986	315 877	357 941	341 614	386 990	360
		Turkeys	Retail Ground Turkey Cecal	304	333	376	396	388	315	300	306	369	368	391	48 374 29
		Cattle	Retail Ground Beef Cecal (Beef)	295	311	338	316	295	256	250	247	269	215	271	227 293
		Swine	Cecal (Dairy)  Retail Pork Chops  Cecal (Market Hogs)	184	218	232	205	182	152	146	147	183	146	161	256 208 118
	Antimicrobial	Ó	Cecal (Sows)												120
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
Cephems	Cefoxitin (MIC ≥ 32 µg/mI)	SI	Retail Chickens	11.0% 31	9.3% 37	8.3% 33	11.2% 44	11.2% 47	7.4% 22	11.8% 36	13.3% 42	6.7% 24	13.2% 45	7.8% 30	5.0% 18
		Chickens	HACCP	8.5% 178	8.3% 113	8.2% 139	9.9% 221	15.0% 204	10.3% 155	13.8% 136	11.4% 100	12.5% 118	9.1% 56	9.2% 91	
		0	Cecal												2.19
		eys	Retail Ground Turkey	3.3% 10	1.2% 4	4.5% 17	3.3% 13	6.2% 24	6.3% 20	6.3% 19	7.8% 24	9.2% 34	12.5% 46	11.3% 44	7.89 29
		Turkeys	Cecal												3.49
			Retail Ground Beef	1.4% 4	0.3%	1.2%	1.0%	2.0%	0.8%	2.4% 6	1.6% 4	1.1%	0.5%	1.8%	1.3%
		Cattle	Cecal (Beef)	4		-	3			0	4	3		3	0.0%
			Cecal (Dairy)												1.2%
			Retail Pork Chops	3.3%	2.3%	2.2%	1.5%	1.6%	0.7%	3.4%	6.8%	0.5%	0.0%	1.9%	1.0%
		Swine	Cecal (Market Hogs)	6	5	5	3	3	1	5	10	1	0	3	0.8%
	Ceftiofur	Ó	Cecal (Sows)												0.8%
			Retail Chickens	7.1%	7.6%	5.8%	8.7%	8.6%	6.0%	10.8%	11.8%	5.6%	12.3%	7.5%	4.4%
	(MIC ≥ 8 μg/ml)	Chickens	HACCP	20 5.5%	30 7.1%	23 4.9%	34 6.5%	36 10.2%	7.0%	33 10.5%	9.5%	20 10.0%	42 6.8%	29 7.6%	16
		S	Cecal	115	97	83	145	139	106	103	83	94	42	75	2.1%
		ς.	Retail Ground Turkey	1.0%	0.3%	1.1%	1.8%	3.1%	6.0%	3.7%	6.2%	7.9%	9.8%	9.2%	6.4%
		Turkeys	Cecal	3	1	4	7	12	19	11	19	29	36	36	3.4%
		_		0.0%	0.3%	0.9%	0.6%	1.0%	0.8%	1.6%	0.8%	1.1%	0.9%	0.0%	1.8%
		ap.	Retail Ground Beef	0	1	3	2	3	2	4	2	3	2	0	0.0%
		Cattle	Cecal (Beef)												1.2%
			Cecal (Dairy)	0.5%	0.9%	0.4%	0.0%	0.0%	0.7%	3.4%	6.8%	0.0%	0.0%	1.2%	3
		e e	Retail Pork Chops	1	2	1	0	0	1	5	10	0.070	0	2	3
		Swine	Cecal (Market Hogs)												0.8%
	0.00		Cecal (Sows)	7.00/	0.40/	0.50/	10.00/	0.40/	0.40/	44.40/	10.10/	0.40/	10.00/	7.00/	1
	Cettriaxone (MIC ≥ 4 μg/ml)	ens	Retail Chickens	7.8% 22 8.6%	9.1% 36 9.4%	6.5% 26 7.2%	10.2% 40 9.0%	9.1% 38 14.7%	6.4% 19 10.3%	11.1% 34 13.5%	12.4% 39 11.5%	6.4% 23 12.3%	12.6% 43 9.3%	7.8% 30 8.8%	4.4%
		Chickens	HACCP	181	128	122	200	199	155	133	101	116	57	87	2.1%
			Cecal	1.3%	0.3%	1.3%	2.3%	3.1%	6.0%	3.7%	6.9%	8.9%	10.1%	9.7%	6.7%
		Turkeys	Retail Ground Turkey	4	1	5	9	12	19	11	21	33	37	38	25
		ř	Cecal	0.0%	0.3%	1.5%	1.9%	1.7%	0.8%	1.6%	0.8%	1.1%	0.5%	0.0%	1 2.2%
		Φ	Retail Ground Beef	0.0%	1	5	6	5	2	4	2	3	1	0.0%	5
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)												1.6%
			Retail Pork Chops	0.5% 1	0.9% 2	0.4% 1	0.5% 1	0.6% 1	0.7% 1	3.4% 5	6.8% 10	0.0%	0.0%	1.2% 2	1.4%
		Swine	Cecal (Market Hogs)												0.8%
			Cecal (Sows)												0.8%
Folate Pathway Inhibito	Sulfamethoxazole/ Sulfisoxazole <sup>2</sup>	SI	Retail Chickens	32.3% 91	38.4% 152	41.3% 165	48.1% 189	46.9% 196	42.1% 126	39.2% 120	40.6% 128	38.9% 139	44.3% 151	37.8% 146	39.29 141
	(MIC ≥ 512 μg/ml)	Chickens	HACCP	46.1% 969	43.9% 599	53.2% 903	51.9% 1159	48.6% 660	53.2% 804	52.7% 520	52.6% 461	51.8% 487	54.7% 336	47.6% 471	
		0	Cecal												37.5% 18
		ske	Retail Ground Turkey	48.0% 146	51.7% 172	48.4% 182	48.0% 190	48.5% 188	48.9% 154	51.0% 153	53.9% 165	44.7% 165	51.9% 191	56.8% 222	50.09 187
		Turkeys	Cecal		2	.52			.54	.55					55.29 16
			Retail Ground Beef	9.8%	10.3%	13.0%	7.0%	12.5%	9.4%	11.6%	7.7%	12.6%	7.9%	7.4%	7.9%
		Cattle	Cecal (Beef)	29	32	44	22	37	24	29	19	34	17	20	9.2%
		Ö	Cecal (Dairy)												5.5%
		$\vdash$	Retail Pork Chops	12.5%	15.1%	19.4%	14.1%	20.3%	11.8%	16.4%	14.3%	16.4%	10.3%	6.8%	10.19
		Swine	Cecal (Market Hogs)	23	33	45	29	37	18	24	21	30	15	11	21 19.5%
		Š	Cecal (Sows)												13.3%
	nsates were not sampled for		200a. (20113)												16

<sup>&</sup>lt;sup>1</sup> In 2013, chicken carcass rinsates were not sampled for *E. coli*<sup>2</sup> Sulfamethoxazole was tested from 1996 through 2003 and was replaced by sulfisoxazole in 2004

Table 86c. Antimicrobial Resistance among *E. coli* Isolates, 2002-2013

Table 86c. Antimicrob	ial Resistance am	nong	g <i>E. coli</i> Isolates, 2												
Year		ψ,	Retail Chickens	<b>2002</b> 282	<b>2003</b> 396	<b>2004</b> 400	<b>2005</b> 393	<b>2006</b> 418	<b>2007</b> 299	<b>2008</b> 306	<b>2009</b> 315	<b>2010</b> 357	<b>2011</b> 341	<b>2012</b> 386	<b>2013</b> 360
Number of Isolates Tested		Chickens	HACCP <sup>1</sup>	2100	1365	1697	2232	1357	1510	986	877	941	614	990	300
		_	Cecal												48
		Turkeys	Retail Ground Turkey	304	333	376	396	388	315	300	306	369	368	391	374
		ī	Cecal												29
		Cattle	Retail Ground Beef Cecal (Beef)	295	311	338	316	295	256	250	247	269	215	271	227 293
		ő	Cecal (Dairy)												256
		e e	Retail Pork Chops	184	218	232	205	182	152	146	147	183	146	161	208
		Swine	Cecal (Market Hogs)												118
	Antimicrobial		Cecal (Sows)												120
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
Folate Pathway Inhibitors	Trimethoprim-	十	Retail Chickens	3.6%	7.1%	4.3%	7.4%	8.9%	5.0%	3.6%	2.2%	4.2%	2.3%	2.6%	3.1%
	Sulfamethoxazole (MIC ≥ 4 / 76 µg/ml)	Chickens		10 10.4%	28 10.5%	17 10.7%	29 10.4%	37 8.4%	15 7.9%	9.1%	7.0%	15 6.4%	8 4.2%	10 6.5%	11
	, , ,	Chic	HACCP	218	144	181	232	114	120	90	61	60	26	64	4.2%
		<u>_</u>	Cecal												2
		Turkeys	Retail Ground Turkey	4.0% 12	6.9% 23	3.7% 14	5.1% 20	8.0% 31	7.9% 25	5.3% 16	5.9% 18	5.1% 19	4.3% 16	6.1% 24	3.7% 14
		Ę	Cecal												10.3% 3
			Retail Ground Beef	0.7%	0.3%	0.6%	0.6%	1.4%	1.2%	2.0%	2.0%	0.7%	2.3%	0.4%	1.8%
		Cattle	Cecal (Beef)	2	1	2	2	4	3	5	5	2	5	1	0.0%
		Ca													0.0%
		<u>_</u>	Cecal (Dairy)												0
			Retail Pork Chops	1.1% 2	2.8% 6	3.9% 9	1.5% 3	2.2% 4	1.3% 2	6.2% 9	2.7% 4	3.8% 7	3.4% 5	1.9% 3	1.4% 3
		Swine	Cecal (Market Hogs)												3.4%
		S	Cecal (Sows)												1.7%
Macrolides	Azithromycin	+	Retail Chickens										0.0%	0.0%	0.0%
	(MIC ≥32 μg/ml)	sua											0.2%	0.5%	0
		Chickens	HACCP										1	5	
		Ĺ	Cecal												0.0%
		ske	Retail Ground Turkey										0.0%	0.0%	0.0%
		Turkeys	Cecal										U	U	0.0%
			Retail Ground Beef										0.0%	0.0%	0.9%
		<u>e</u>											0	0	2 0.0%
		Cattle	Cecal (Beef)												0
			Cecal (Dairy)												0.0% 0
			Retail Pork Chops										0.0%	0.0%	0.0%
		Swine	Cecal (Market Hogs)												0.0%
		Ó	Cecal (Sows)												0.0%
Penicillins	Ampicillin	+-		21.6%	25.3%	17.0%	24.7%	20.1%	18.1%	23.5%	22.2%	16.5%	26.4%	0.3%	0 20.8%
	(MIC ≥ 32 μg/ml)	sus	Retail Chickens	61	100	68	97	84	54	72	70	59	90	1	75
		Chickens	HACCP	19.0% 399	18.6% 254	17.6% 298	22.0% 492	25.6% 347	18.7% 282	23.5% 232	19.8% 174	22.2% 209	16.0% 98	17.7% 175	
			Cecal												10.4% 5
		sks	Retail Ground Turkey	31.3% 95	35.7% 119	33.2% 125	38.1% 151	42.0% 163	48.3% 152	58.0% 174	56.2% 172	52.6% 194	51.6% 190	55.5% 217	54.0% 202
		Turkeys	Cecal	95	119	123	131	103	132	174	172	194	190	217	69.0%
				6.1%	5.1%	5.3%	3.5%	9.2%	6.6%	6.4%	4.9%	4.8%	3.7%	2.6%	20 4.8%
		<u>e</u>	Retail Ground Beef	18	16	18	11	27	17	16	12	13	8	7	11 3.8%
		Cattle	Cecal (Beef)												11
		L	Cecal (Dairy)												3.1% 8
			Retail Pork Chops	13.6% 25	13.3% 29	15.1% 35	16.1% 33	15.9% 29	15.8% 24	15.1% 22	11.6% 17	19.1% 35	13.0% 19	13.0% 21	11.5% 24
		Swine	Cecal (Market Hogs)												15.3%
		Ś	Cecal (Sows)												18 22.5%
Phenicols	Chloramphenicol	╁		0.7%	0.0%	1.8%	0.5%	2.6%	2.0%	1.0%	0.6%	1.4%	1.2%	0.3%	27 1.7%
	(MIC ≥ 32 μg/ml)	ens	Retail Chickens	2	0	7	2	11	6	3	2	5	4	1	6
		Chickens	HACCP	1.8% 38	1.3% 18	1.0% 17	1.0% 22	1.9% 26	2.3% 34	1.0% 10	1.1% 10	0.7% 7	2.1% 13	1.9% 19	
		Ĭ	Cecal												0.0%
		,ys	Retail Ground Turkey	0.3%	3.6% 12	0.8%	4.0%	2.3%	2.9% 9	3.7%	3.3%	3.5%	4.9%	5.9% 23	5.3%
		Turkeys	Cecal	1	12	3	16	9	9	11	10	13	18	23	20 0.0%
		Ė		1.0%	2.3%	3.6%	1.6%	1.4%	3.9%	0.8%	2.4%	2.6%	1.4%	1.1%	0 4.0%
			Retail Ground Beef	3	7	12	5	4	10	2	6	7	3	3	9
		Cattle	Cecal (Beef)												3.8% 11
			Cecal (Dairy)												2.3% 6
			Retail Pork Chops	1.6%	4.1%	4.3%	3.4%	6.6%	3.9%	3.4%	4.8%	1.6%	2.7%	3.7%	2.4%
		Swine	Cecal (Market Hogs)	3	9	10	7	12	6	5	7	3	4	6	5 5.1%
	ĺ	š													6 5.8%
			Cecal (Sows)												

Table 86d. Antimicrobial Resistance among E. co/i Isolates, 2002-2013

Year				2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Teste	ed	sus	Retail Chickens	282	396	400	393	418	299	306	315	357	341	386	360
		Chickens	HACCP <sup>1</sup>	2100	1365	1697	2232	1357	1510	986	877	941	614	990	40
			Cecal												48
		Turkeys	Retail Ground Turkey	304	333	376	396	388	315	300	306	369	368	391	374
			Cecal  Retail Cround Roof	205	24.4	220	240	205	050	250	0.47	200	045	074	29
		Cattle	Retail Ground Beef Cecal (Beef)	295	311	338	316	295	256	250	247	269	215	271	227 293
		O	Cecal (Dairy)												256
		e	Retail Pork Chops	184	218	232	205	182	152	146	147	183	146	161	208
		Swine	Cecal (Market Hogs)												118
	Antimicrobial		Cecal (Sows)												120
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
Quinolones	Ciprofloxacin	+	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%	0.0%	0.0%	0.6%
	(MIC ≥ 1 μg/ml)	sens		0.3%	0.2%	0.2%	0.5%	0.1%	0.1%	0.6%	0.5%	1 0.2%	0.3%	0.5%	2
		Chickens	HACCP	6	3	3	11	1	1	6	4	2	2	5	
			Cecal												0.0%
		sk	Retail Ground Turkey	0.0%	0.3%	0.8%	0.0%	0.5%	0.3%	0.0%	0.7% 2	0.5% 2	0.0%	0.3%	0.3%
		Turkeys	Cecal	U	1	3	0	2	'	0	2		0	-	0.0%
		-		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		0	Retail Ground Beef	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		ЭС		0	0	0	0	0	0	0	0	0	0	0	0 1.7%
		Swine	Cecal (Market Hogs)												2
			Cecal (Sows)												0.0%
	Nalidixic Acid		Retail Chickens	2.8%	4.0%	7.0%	6.6%	5.0%	3.0%	2.9%	2.9%	3.6%	2.3%	1.8%	2.5%
	(MIC ≥ 32 μg/ml)	Chickens	HACCP	6.8%	16 6.2%	28 6.8%	26 7.5%	21 5.4%	9 4.2%	6.0%	9 3.2%	13 3.4%	2.3%	2.4%	9
		Chic		142	84	115	168	73	64	59	28	32	14	24	2.1%
			Cecal												1
		eys	Retail Ground Turkey	4.3% 13	11.7% 39	10.6% 40	10.4% 41	5.2% 20	2.2% 7	3.7% 11	2.6% 8	2.7% 10	1.6% 6	0.3% 1	1.9% 7
		Turkeys	Cecal												0.0%
			Retail Ground Beef	0.0%	1.0%	1.5%	1.3%	0.7%	0.4%	0.4%	0.4%	0.0%	0.0%	0.0%	0.4%
		ē		0	3	5	4	2	1	1	1	0	0	0	0.0%
		Cattle	Cecal (Beef)												0
			Cecal (Dairy)												0.0%
			Retail Pork Chops	0.5%	0.5%	0.0%	1.5%	0.5%	0.0%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%
		Swine	Cecal (Market Hogs)			0	3		U	U	U	1	0	U	1.7%
		Š													0.8%
Tatuanalinaa	T-tP		Cecal (Sows)	40.40/	40.00/	40.00/	40.00/	50.50/	40.50/	40.00/	44.00/	00.00/	10.00/	00.40/	1
Tetracyclines	Tetracycline (MIC ≥ 16 µg/ml)	SL	Retail Chickens	46.1% 130	42.9% 170	48.0% 192	46.6% 183	50.5% 211	40.5% 121	43.8% 134	41.6% 131	38.9% 139	40.8% 139	39.4% 152	43.3% 156
		Chickens	HACCP	58.6% 1231	52.2% 713	50.3% 853	48.9% 1092	49.0% 665	40.2% 607	47.4% 467	49.1% 431	42.9% 404	46.6% 286	45.4% 449	
		ò	Cecal	1231	713	633	1092	003	607	407	431	404	200	449	29.2%
		<u> </u>		77.0%	77.8%	74.2%	78.0%	76.5%	80.0%	85.7%	82.0%	69.4%	79.9%	77.2%	14 74.3%
		Turkeys	Retail Ground Turkey	234	259	279	309	297	252	257	251	256	294	302	278
		ı,	Cecal												69.0% 20
			Retail Ground Beef	30.9% 91	25.1% 78	22.8% 77	16.5% 52	25.4% 75	21.9% 56	24.0% 60	18.6% 62	22.7% 61	17.7% 38	22.1% 60	22.5% 51
		Cattle	Cecal (Beef)	31	70	11	JZ	75	30	30	UZ.	OI	36	30	25.9%
		ő													76 0.4%
		-	Cecal (Dairy)	50.70	40.001	50.001	45.00	F0 ===:	50.001	F4 ***	40.00	44.50	40.551	00.101	1
			Retail Pork Chops	52.7% 97	46.3% 101	56.0% 130	45.9% 94	52.7% 96	50.0% 76	54.8% 80	46.9% 69	44.3% 81	46.6% 68	39.1% 63	51.4% 107
		Swine	Cecal (Market Hogs)												63.6% 75
		0)	Cecal (Sows)												70.8%
1 In 2013, chicken carcage rin															85

<sup>&</sup>lt;sup>1</sup> In 2013, chicken carcass rinsates were not sampled for *E. coli* 

Table 87a. Resistance Patt	ems :	among E. COII ISOIA	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested	Su	Retail Chickens	282	396	400	393	418	299	306	315	357	341	386	360
	Chickens	HACCP <sup>2</sup>	2100	1365	1697	2232	1357	1510	986	877	941	614	990	
		Cecal												48
	Turkeys	Retail Ground Turkey	304	333	376	396	388	315	300	306	369	368	391	374
	-	Cecal  Retail Ground Beef	295	044	338	040	205	050	050	0.47	000	045	271	29 227
	Cattle	Cecal (Beef)	295	311	338	316	295	256	250	247	269	215	2/1	293
		Cecal (Dairy)												256
	e e	Retail Pork Chops	184	218	232	205	182	152	146	147	183	146	161	208
	Swine	Cecal (Saura)												118
Resistance Pattern		Cecal (Sows) Source												120
1. No Resistance Detected	s	Retail Chickens	27.0% 76	20.5% 81	20.8% 83	20.6% 81	23.7% 99	29.1% 87	33.3% 102	34.3% 108	33.3% 119	25.2% 86	35.8% 138	30.8% 111
	Chickens	HACCP	15.9% 333	16.0% 219	17.0% 288	17.7% 395	18.6% 252	24.3% 367	20.9% 206	21.9% 192	21.5% 202	21.5% 132	27.5% 272	
	ò	Cecal	333	213	200	333	232	307	200	132	202	132	EIZ	39.6%
	S	Retail Ground Turkey	16.8%	14.7%	19.1%	16.2%	16.0%	13.0%	8.3%	11.8%	17.3%	13.3%	13.3%	19 14.4%
	Turkeys		51	49	72	64	62	41	25	36	64	49	52	54 17.2%
	<u> </u>	Cecal	00.40/	00.00/	70.40/	00.40/	74.50/	77.00/	70.00/	70.40/	70.00/	70.50/	75.00/	5
		Retail Ground Beef	63.1% 186	66.9% 208	73.1% 247	80.4% 254	71.5% 211	77.0% 197	73.2% 183	78.1% 193	76.6% 206	79.5% 171	75.6% 205	76.7% 174
	Cattle	Cecal (Beef)												73.0% 214
		Cecal (Dairy)												82.8% 212
		Retail Pork Chops	41.3%	44.5%	37.9%	49.3%	42.9%	48.0%	43.8%	51.0%	50.8%	52.1%	56.5%	46.2%
	Swine	Cecal (Market Hogs)	76	97	88	101	78	73	64	75	93	76	91	96 33.9%
	Š													40 27.5%
2. Resistance to ≥ 3		Cecal (Sows)	36.2%	42.2%	35.3%	45.0%	43.3%	33.8%	36.6%	37.5%	28.6%	32.8%	29.8%	33 31.4%
Antimicrobial Classes	22	Retail Chickens	102	167	141	177	181	101	112	118	102	112	115	113
	Chickens	HACCP	43.9% 921	39.2% 535	42.9% 728	41.5% 926	43.7% 593	36.7% 554	44.1% 435	41.4% 363	38.3% 360	37.3% 229	34.6% 343	
	0	Cecal												16.7% 8
	ys	Retail Ground Turkey	55.6%	55.6%	51.9%	52.5%	55.2%	57.5%	63.7%	66.3%	55.3%	62.2%	67.8%	59.4%
	Turkeys	Cecal	169	185	195	208	214	181	191	203	204	229	265	222 62.1%
	<u> </u>	Retail Ground Beef	10.2%	7.4%	10.4%	5.4%	11.5%	9.0%	11.2%	6.9%	11.5%	5.6%	9.6%	18 7.9%
	e.		30	23	35	17	34	23	28	17	31	12	26	18 8.2%
	Cattle	Cecal (Beef)												24
		Cecal (Dairy)												6.3% 16
		Retail Pork Chops	17.4% 32	17.9% 39	21.1% 49	16.1% 33	15.9% 29	15.1% 23	17.8% 26	15.0% 22	17.5% 32	8.9% 13	12.4% 20	13.9% 29
	Swine	Cecal (Market Hogs)												21.2% 25
	0,	Cecal (Sows)												21.7%
3. Resistant to ≥ 4		Retail Chickens	13.8%	13.6%	12.5%	12.2%	14.6%	10.4%	13.7%	13.7%	10.6%	10.3%	7.5%	26 9.4%
Antimicrobial Classes	sua		39 14.3%	54 13.8%	50 11.7%	48 14.9%	61 17.5%	31 13.6%	42 16.6%	43 14.5%	38 15.1%	35 11.7%	29 11.9%	34
	Chickens	HACCP	300	188	199	333	137	206	164	127	142	72	118	
		Cecal												4.2% 2
	eys	Retail Ground Turkey	23.0% 70	30.0% 100	24.5% 92	24.0% 95	25.8% 100	27.0% 85	32.3% 97	38.9% 119	28.2% 104	32.9% 121	37.9% 148	31.6% 118
	Turkeys	Cecal			,=									37.9% 11
		Retail Ground Beef	1.7%	4.2%	4.7%	1.9%	5.8%	4.7%	4.4%	3.6%	3.0%	1.9%	1.1%	4.8%
	Cattle	Cecal (Beef)	5	13	16	6	17	12	11	9	8	4	3	3.4%
	Ö	Cecal (Dairy)												10 3.1%
	_		5.4%	6.9%	7.8%	4.9%	7.7%	3.3%	7.5%	10.9%	6.0%	2.1%	4.3%	8 3.4%
	Φ	Retail Pork Chops	10	15	18	10	14	5	11	16	11	3	7	7 6.8%
	Swine	Cecal (Market Hogs)												8
		Cecal (Sows)												9.2% 11
4. Resistant to ≥ 5 Antimicrobial Classes		Retail Chickens	6.0% 17	7.3% 29	6.0% 24	5.9% 23	7.4% 31	5.7% 17	8.2% 25	6.4% 20	4.5% 16	3.8% 13	3.1% 12	2.8% 10
Antimorobial Glasses	Chickens	HACCP	7.4%	7.2%	5.8%	7.6%	8.9%	7.1%	9.0%	7.5%	8.2%	6.5%	7.2%	10
	ᅙ	Cecal	155	98	98	170	121	107	89	66	77	40	71	2.1%
	<u> </u>		9.2%	14.7%	6.9%	6.3%	5.7%	4.1%	6.3%	7.8%	6.5%	7.9%	12.8%	9.6%
	Turkeys	Retail Ground Turkey	28	49	26	25	22	13	19	24	24	29	50	36 3.4%
	ĭ	Cecal												1
	$\vdash$	10.00	0.3%	2.6% 8	2.7% 9	1.0%	2.4% 7	0.4% 1	2.0% 5	1.2% 3	0.7% 2	0.9% 2	0.4% 1	2.2% 5
		Retail Ground Beef	1											0.7%
	Cattle	Cecal (Beef)	1											2
	Cattle		1											2.0%
	Cattle	Cecal (Beef) Cecal (Dairy)	3.3%	2.8%	2.2%	1.5%	3.3%	1.3%	4.1%	5.4%	1.1%	0.0%	1.9%	2.0% 5 1.0%
	-	Cecal (Beef)  Cecal (Dairy)  Retail Pork Chops			2.2%	1.5%	3.3%	1.3%	4.1%	5.4% 8	1.1%	0.0%	1.9%	2.0% 5
	Swine Cattle	Cecal (Beef) Cecal (Dairy)	3.3%	2.8%										2.0% 5 1.0% 2

<sup>1</sup> Starting in 2011, testing included nine antimicrobial classes with the addition of the macrolide azithromycin. Because resistance to azithromycin is low (in this case, <1%), antimicrobial class resistance data from 2011 and beyond are comparable to the data from previous years.

<sup>2</sup> In 2013, chicken carcass rinsates were not sampled for *E. coli* 

Table 87b. Resistance Patterns among E. coli Isolates, 2002-2013 2012 Year 2004 2005 2006 2007 2008 2009 2010 2011 2013 Number of Isolates Tested Ratail Chickans 2100 1365 1697 2232 1357 1510 986 877 941 614 990 HACCP1 18 Retail Ground Turkey 304 333 376 396 388 315 300 306 369 368 391 374 29 316 295 311 338 295 256 250 247 269 215 271 227 Retail Ground Beef 293 Cecal (Beef) 256 Cecal (Dairy) 184 218 232 205 182 152 146 147 183 146 161 208 Retail Pork Chops 118 Cecal (Market Hogs) 120 Cecal (Sows) Resistance Pattern

5. At Least ACSSuT<sup>2</sup> Resistant Retail Chickens 0.4% 0.0% 1.3% 0.3% 1.4% 2.0% 1.0% 0.6% 1.1% 1.2% 0.3% 0.8% 1.3% 1.0% 0.8% 0.6% 1.3% 1.7% 0.2% 0.3% 0.7% 1.0% 0.5% HACCE 0.0% Cecal 0.0% 2.7% 0.5% 1.8% 0.8% 1.9% 2.0% 2.3% 2.2% 3.0% 5.1% 3.2% Retail Ground Turkey 0.0% Cecal 0.3% 1.0% 0.3% 0.0% 1.5% 0.6% 0.0% 0.4% 0.9% Retail Ground Beef Cattle 0.7% Cecal (Reef) 1.2% Cecal (Dairy) 3 0.5% Retail Pork Chops 0.5% 1.4% 1.3% 1.0% 1.1% 0.7% 2.0% 0.5% 0.0% 0.6% 0.8% Cecal (Market Hogs) 1.7% Cecal (Sows) 6 At Least ACT/S Resistant 0.0% 0.0% 0.3% 0.0% 0.0% 0.3% 0.0% 0.0% 0.3% 0.0% 0.0% 0.8% Retail Chickens 0.2% 0.3% 0.3% 0.3% 0.2% 0.2% 0.0% 0.3% HACCP 0.0% Cecal 0.0% 0.9% 0.0% 0.8% 0.3% 0.3% 0.0% 0.3% 1.1% 0.0% 1.0% 0.3% Turkeys Retail Ground Turkey 0.0% Cecal 0.0% 0.9% Retail Ground Beef 0.0% 0.0% 0.3% 0.3% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Cecal (Beef) 0 0.0% Cecal (Dairy) 0.5% 0.5% 0.0% 0.4% 0.5% 0.0% 0.0% 0.0% 0.7% 0.0% 0.0% 0.6% Retail Pork Chops Cecal (Market Hogs) 0.8% Cecal (Sows) 7. At Least ACSSuTAuCx 0.4% 0.3% 1.0% 0.7% 0.7% 0.6% 0.8% 0.0% 0.3% 0.0% Retail Chickens 0.7% 1.2% 0.8% 0.6% 1.2% 0.4% 0.2% 0.3% 0.7% 0.7% 1.1% HACCP 11 17 0.0% 0.0% 0.3% 0.0% 0.3% 0.0% 1.3% 1.3% 1.0% 1.1% 0.0% 1.0% 0.3% Turkeys Retail Ground Turkey 0.0% Cecal Retail Ground Beef 0.0% 0.0% 0.9% 0.3% 0.0% 0.0% 0.0% 0.0% 0.4% 0.0% 0.0% Cecal (Beef) 0.4% Cecal (Dairy) 0.0% 0.5% 0.4% 0.0% 0.0% 0.7% 0.7% 2.0% 0.0% 0.0% 0.6% 0.0% Retail Pork Chops 0.0% Cecal (Market Hogs) 0 0.0% Cecal (Sows) 8. At Least Ceftriaxone and 0.7% 0.5% 1.5% 0.3% 0.2% 0.0% 1.0% 0.3% 0.5% 0.3% Retail Chickens 0.6% 1.0% 0.6% 1.1% 0.9% 0.9% 0.9% 0.6% 0.5% 0.2% HACCP 0.0% 0.3% 0.3% 0.3% 0.3% 0.0% 0.6% 0.0% 0.0% 0.8% 0.0% Retail Ground Turkey 0.0% Cecal 0.0% 0.0% 0.3% 0.3% 0.3% 0.0% 0.0% 0.4% 0.0% 0.0% 0.0% 0.0% Retail Ground Beef Cecal (Beef)

0.5%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

Cecal (Dairy)

Retail Pork Chops

Cecal (Market Hogs)

Cecal (Sows)

0.0%

0.0%

0.0%

<sup>&</sup>lt;sup>1</sup> In 2013, chicken carcass rinsates were not sampled for E. coli

<sup>&</sup>lt;sup>2</sup> ACSSuT = ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline

<sup>&</sup>lt;sup>3</sup> ACT/S = ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole

 $<sup>^{\</sup>rm 4}$  ACSSuTAuCx = ACSSuT, amoxicillin-clavulanic acid, and ceftriaxone

Antimicrobial Class	Antimorobial Agent	Resistance to Selected βe Isolate Source (# of Isolates)	%I <sup>1</sup> (or S-DD <sup>2</sup> )	%R³	[95% CI] <sup>4</sup>	0.015 0.03							%) of M 4	ICs (µg 8	/ml)⁵ 16	32	64	128	256	512	1024
β-Lactam/β-Lactamase Inhibitor Combinations	Piperacillin-tazobactam	Retail Chickens (29)	0.0	0.0	[0.0 - 11.9]						6.9	34.5	48.3	6.9	3.4						
		ੇ HACCP (87)	0.0	0.0	[0.0 - 4.2]					5.7	23.0	56.3	14.9								
		Retail Ground Turkey (37)	2.7	0.0	[0.0 - 9.5]						2.7	21.6	43.2	24.3	5.4	2.7					
		Retail Ground Beef (0)	N/A	N/A	N/A																
		Retail Pork Chops (2)	0.0	0.0	[0.0 - 84.2]								100.0								
Cephems	Cefepime	Retail Chickens (29)	6.8	0.0	[0.0 - 11.9]			6.9	58.7	24.1	3.4		3.4	3.4							
		5 HACCP (87)	0.0	0.0	[0.0 - 4.2]		10.3	25.3	50.6	13.8											
		र्हे Retail Ground Turkey (37)	0.0	0.0	[0.0 - 9.5]			5.4	56.8	35.1	2.7										
		Retail Ground Beef (0)	N/A	N/A	N/A																
		Retail Pork Chops (2)	0.0	0.0	[0.0 - 84.2]			50.0	50.0												
	Cefotaxime	Retail Chickens (29)	0.0	100.0	[88.1 - 100.0]								6.9	69.0	20.7	3.4					
		ਲੈ HACCP (87)	3.4	87.4	[78.5 - 93.5]		6.9	2.3				3.4	20.7	54.0	12.6						
		Retail Ground Turkey (37)	2.7	97.3	[85.8 - 99.9]							2.7		64.9	27.0	5.4					
		Retail Ground Beef (0)	N/A	N/A	N/A																
		Retail Pork Chops (2)	0.0	100.0	[15.8 - 100.0]								50.0		50.0						
	Ceftazidime	Retail Chickens (29)	44.9	44.8	[26.4 - 64.3]						3.4	3.4	3.4	44.9	41.4	3.4					
		ਰ HACCP (87)	48.3	32.2	[22.6 - 43.1]		1.2	4.6	3.4			2.3	8.0	48.3	32.2						
		용한 Retail Ground Turkey (37)	43.2	54.1	[36.9 - 70.5]								2.7	43.2	43.2	10.8					
		Retail Ground Beef (0)	N/A	N/A	N/A																
		Retail Pork Chops (2)	50.0	50.0	[1.3 - 98.7]									50.0	50.0						
Monobactam	Aztreonam	Retail Chickens (29)	37.9	0.0	[0.0 - 11.9]							10.3	51.7	37.9							
		S HACCP (87)	12.6	1.1	[0.0 - 6.2]		8.1	1.2			8.1	19.5	49.4	12.6	1.1						
		Retail Ground Turkey (37)	37.8	10.8	[3.0 - 25.4]							8.1	43.2	37.8	10.8						
		Retail Ground Beef (0)	N/A	N/A	N/A																
		© E S Retail Pork Chops (2)	50.0	0.0	[0.0 - 84.2]								50.0	50.0							
Penems	Imipenem	Retail Chickens (29)	0.0	0.0	[0.0 - 11.9]			37.9	62.1												
		HACCP (87)	0.0	0.0	[0.0 - 4.2]		4.6	64.4	31.0												
		Retail Ground Turkey (37)	0.0	0.0	[0.0 - 9.5]			29.7	70.3												
		Retail Ground Beef (0)	N/A	N/A	N/A																
		Retail Pork Chops (2)	0.0	0.0	[0.0 - 84.2]				100.0												

<sup>Percent of isolates with intermediate susceptibility

Percent of isolates that are susceptible-dose dependent (S-DD). Celepime MIC's above the susceptible range but below the resistant range are designed by CLSI to be S-DD.

Percent of isolates that are susceptible-dose dependent (S-DD). Celepime MIC's above the susceptible range but below the resistant range are designed by CLSI to be S-DD.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %s, to the right of the double vertical bars, are due to rounding

95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method.

The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.</sup> 

Antimicrobial Class	Antimicrobial Agent	Isolate Source (# of Isolates)	%l 1 (or S-DD2)	%R <sup>3</sup>	[95% CI] <sup>4</sup>	0.015 0.03	0.06	0.125	0.25	0.50	Distril 1	oution ( 2	%) of M 4	ICs (µg. 8	/ml)⁵ 16	32	64	128	256	512	1024
β-Lactam/β-Lactamase	Piperacillin-tazobactam	Retail Chickens (15)	0.0	0.0	[0.0 - 21.8]			25			-	33.3	60.0	6.7		<u> </u>					
Inhibitor Combinations		Ö Cecal (1)	0.0	0.0	[0.0 - 97.5]									100.0							
			0.0		[0.0 - 14.2]							25.0	41.7		12						
		Retail Ground Turkey (24)  Cecal (1)	0.0	0.0	[0.0 - 14.2]							25.0	41.7	29.2	4.2 100.0						
		00001 (1)	0.0									40.0	40.0	20.0	100.0						
		Retail Ground Beef (5)  Cecal (Beef) (0)	N/A	0.0 N/A	[0.0 - 52.2] N/A							40.0	40.0	20.0							
		Cecal (Dairy) (4)	0.0	0.0	[0.0 - 60.2]																
		Retail Pork Chops (3)	0.0	0.0	[0.0 - 70.8]							100.0									
		Cecal (Market Hogs) (1)	0.0	0.0	[0.0 - 97.5]								100.0	400.0							
Cephems	Cefepime	Cecal (Sows) (1)	0.0	0.0	[0.0 - 97.5]									100.0	I						_
Серпеніз	Согорино	Retail Chickens (15)	6.7	0.0	[0.0 - 21.8]				66.7	26.7	400.0		6.7								
		ច៍ Cecal (1)	0.0	0.0	[0.0 - 97.5]						100.0										
		Retail Ground Turkey (24)	0.0	4.2	[0.1 - 21.1]			4.2	45.8	41.7	4.2				4.2						
		E Cecal (1)	0.0	0.0	[0.0 - 97.5]					100.0											
		Retail Ground Beef (5)	0.0	20.0	[0.5 - 71.6]				40.0	20.0		20.0			20.0						
		Cecal (Beef) (0) Cecal (Dairy) (4)	N/A 0.0	N/A 0.0	N/A [0.0 - 60.2]			25.0	25.0	25.0		25.0									
		Retail Pork Chops (3)	33.3	0.0	[0.0 - 70.8]				66.7				33.3								
		Cecal (Market Hogs) (1)	0.0	0.0	[0.0 - 97.5]				100.0												
		Cecal (Sows) (1)	0.0	0.0	[0.0 - 97.5]						100.0		1								
	Cefotaxime	Retail Chickens (15)	0.0	100.0	[78.2 - 100.0]									73.3	13.3	13.3					
		Ö Cecal (1)	0.0	100.0	[2.5 - 100.0]										100.0						
		Retail Ground Turkey (24)	0.0	100.0	[85.8 - 100.0]								4.2	45.8	41.7	4.2		4.2			
		E Cecal (1)	0.0	100.0	[2.5 - 100.0]										100						
		Retail Ground Beef (5)	0.0	100.0	[47.8 - 100.0]								40.0	40.0				20.0			
		Cecal (Beef) (0) Cecal (Dairy) (4)	N/A 0.0	N/A 100.0	N/A [39.8 - 100.0]								25.0	50.0	25.0						
		Retail Pork Chops (3)	0.0	100.0	[29.2 - 100.0]								23.0	66.7	25.0	33.3					
		Cecal (Market Hogs) (1)	0.0	0.0	[0.0 - 97.5]									100.0		33.3					
		Cecal (Sows) (1)	0.0	100.0	[2.5 - 100.0]										100.0						
	Ceftazidime	Retail Chickens (15)	46.7	46.7	[21.3 - 73.4]							6.7		46.7	40.0	6.7					
		ਨੂੰ Cecal (1)	0.0	100.0	[2.5 - 100.0]											100.0					
		Retail Ground Turkey (24)	54.2	41.7	[22.1 - 63.4]								4.2	54.2	33.3	8.3					
		E Cecal (1)	0.0	100.0	[2.5 - 100.0]										100.0						
		Retail Ground Beef (5)	40.0	60.0	[14.7 - 94.7]									40.0	60.0						
		Cecal (Beef) (0) Cecal (Dairy) (4)	N/A 50.0	N/A 50.0	N/A [6.8 - 93.2]									50.0	50.0						
		Retail Pork Chops (3)	33.3	33.3	[0.8 - 90.6]						33.3			33.3	33.3						
		Cecal (Market Hogs) (1)	0.0	100.0	[2.5 - 100.0]										100.0						
Managaran .	A-t	Cecal (Sows) (1)	0.0	100.0	[2.5 - 100.0]		-										100.0				
Monobactam	Aztreonam	Retail Chickens (15)	26.7	6.7	[0.2 - 31.9]							6.7	60.0	26.7	6.7						
		Ö Cecal (1)	100.0	100.0	[2.5 - 100.0]									100.0							
		Retail Ground Turkey (24) Cecal (1)	58.3 100.0	4.2 0.0	[0.1 - 21.1] [0.0 - 97.5]							4.2	33.3	58.3 100.0		4.2					
		Retail Ground Beef (5)	20.0	20.0	[0.5 - 71.6]								60.0	20.0		20.0					
		Cecal (Beef) (0)	N/A	N/A	[0.5 - 7 1.6] N/A								00.0	20.0		20.0					
		Cecal (Dairy) (4)	25.0	0.0	[0.0 - 60.2]							25.0	50.0	25.0							
		Retail Pork Chops (3)	0.0	0.0	[0.0 - 70.8]								100.0								
		Cecal (Market Hogs) (1)  Cecal (Sows) (1)	100.0 100.0	0.0	[0.0 - 97.5] [0.0 - 97.5]									100.0							
Penems	Imipenem	S						67	93.3		1		1	100.0							
		Retail Chickens (15)	0.0	0.0 100.0	[0.0 - 21.8] [2.5 - 100.0]			6.7	93.3						100.0						
		Retail Ground Turkey (24)	4.2		[0.0 - 14.2]			4.2	87.5	4.2		4.2			. 50.0						
		Retail Ground Turkey (24)  Cecal (1)	0.0	0.0 100.0	[2.5 - 100.0]			4.2	100.0			4.2									
		Retail Ground Beef (5)	0.0	0.0	[0.0 - 52.2]			20.0	80.0												
		Cecal (Beef) (0)	N/A	N/A	N/A			_5.0	-5.0												
		Cecal (Dairy) (4)	0.0	0.0	[0.0 - 60.2]			25.0	50.0												
		Retail Pork Chops (3)  Cecal (Market Hogs) (1)	0.0	0.0	[0.0 - 70.8] [0.0 - 97.5]				100.0 100.0												
		Cecal (Market Hogs) (1) Cecal (Sows) (1)	0.0	100.0	[2.5 - 100.0]		L		. 55.0		_		L	100.0							

<sup>Percent of isolates with intermediate susceptibility
Percent of isolates that are susceptible-dose dependent (S-DD). Cefepime MIC's above the susceptible range but below the resistant range are designed by CLSI to be S-DD.

Percent of isolates that are susceptible-dose dependent (S-DD). Cefepime MIC's above the susceptible range but below the resistant range are designed by CLSI to be S-DD.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %s, to the right of the double vertical bars, are due to rounding
PS% confidence intervals for percent resistant (%R) were calculated using the Clooper-Pearson exact method
The unshaded areas indicate the range of dilutions tested for each antimicrobial. Single vertical bars indicate the breakpoints for resistance. Numbers in the shaded areas indicate the percentages of isolates with MICs greater than the highest tested concentrations. Numbers listed for the lowest tested concentrations represent the percentages of isolates with MICs equal to or less than the lowest tested concentration.</sup> 

## Enterococcus Data

# **Enterococcus** Isolates Tested

Table 90. Number of *Enterococcus* Isolates Tested, 2002-2013

	Source	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
sue	Retail Chickens	381	466	466	457	469	339	348	349	439	433	456	439
Chickens	HACCP <sup>1</sup>		2043	2456	3035	2120	1571	916	832	948	524		
	Cecal												46
Turkeys	Retail Ground Turkey	395	447	466	470	465	348	360	360	460	480	476	457
Tur	Cecal												30
	Retail Ground Beef	383	432	448	447	438	334	337	327	415	423	453	454
Cattle	Cecal (Beef)												261
	Cecal (Dairy)												256
	Retail Pork Chops	387	418	437	452	435	329	343	328	417	435	460	391
Swine	Cecal (Market Hogs)												107
S	Cecal (Sows)												102

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, chicken carcass rinsates were not sampled for *Enterococcus* 

## Isolation of Enterococcus from Retail Meats

Table 91. Number and Percent of Retail Meat Samples Culture Positive for *Enterococcus*, 2012

	Retail Chickens	Retail Ground Turkeys	Retail Ground Beef	Retail Pork Chops
Number of Meat Samples Tested	480	476	480	480
Number Positive for Enterococcus	456	460	453	416
Percent Positive for Enterococcus	95.0%	96.6%	94.4%	86.7%

Figure 18. Percent of Retail Meat Samples Culture Positive for *Enterococcus*, 2012

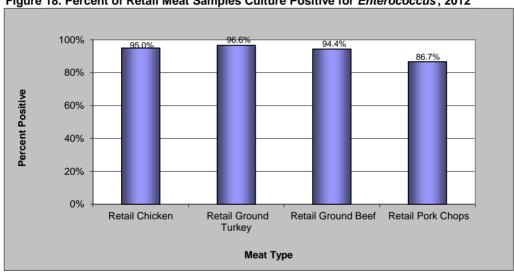
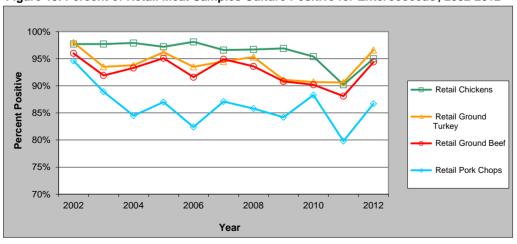


Figure 19. Percent of Retail Meat Samples Culture Positive for *Enterococcus*, 2002-2012



# Isolation of Enterococcus from Retail Meats

Table 92. Number and Percent of Retail Meat Samples Culture Positive for *Enterococcus*, 2013

	Retail Chickens	Retail Ground Turkey	Retail Ground Beef	Retail Pork Chops
Number of Meat Samples Tested	480	478	480	480
Number Positive for Enterococcus	439	457	454	391
Percent Positive for Enterococcus	91.5%	95.6%	94.6%	81.5%

Figure 20. Percent of Retail Meat Samples Culture Positive for Enterococcus, 2013

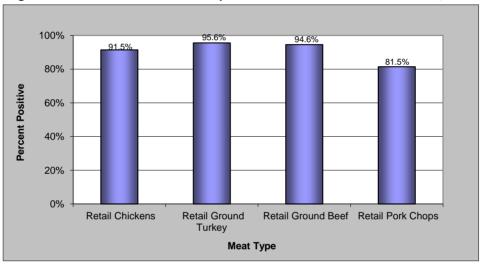
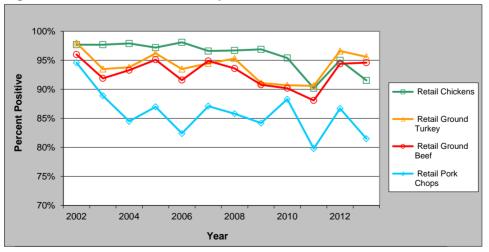


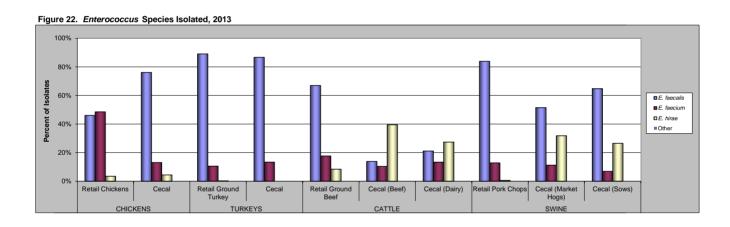
Figure 21. Percent of Retail Meat Samples Culture Positive for *Enterococcus*, 2002-2013



# Enterococcus Species

Table 93. Enterococcus Species Isolated, 2013

	Chic	kens	Turke	eys		Cattle			Swine	
	Retail Chickens (n=439)	Cecal (n=46)	Retail Ground Turkey (n=457)	Cecal (n=30)	Retail Ground Beef (n=454)	Cecal (Beef) (n=261)	Cecal (Dairy) (n=256)	Retail Pork Chops (n=391)	Cecal (Market Hogs) (n=107)	Cecal (Sows) (n=102)
Enterococcus Species										
E. faecalis	46.0% 202	76.1% 35	89.1% 407	86.7% 26	67.0% 304	13.8% 36	21.1% 54	83.9% 328	51.4% 55	64.7% 66
E. faecium	48.5% 213	13.0% 6	10.5% 48	13.3% 4	17.6% 80	10.3% 27	13.3% 34	12.8% 50	11.2% 12	6.9% 7
E. hirae	3.4% 15	4.3% 2	0.2% 1	0.0% 0	8.4% 38	39.5% 103	27.3% 70	0.5% 2	31.8% 34	26.5% 27
E. durans	0.9% 4	4.3% 2	0.0% 0	0.0% 0	5.9% 27	10.7% 28	8.6% 22	0.8%	4.7% 5	1.0% 1
E. gallinarum	0.5% 2	0.0%	0.0% 0	0.0%	0.4% 2	1.1% 3	2.7% 7	0.5%	0.9% 1	1.0%
E. avium	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.4%	0.4% 1	0.0%	0.0%	0.0%
E. casseliflavus	0.0% 0	2.2%	0.0%	0.0%	0.0%	10.7% 28	13.7% 35	0.0%	0.0%	0.0%
E. mundtii	0.0% 0	0.0%	0.0%	0.0%	0.0%	9.2% 24	9.8% 25	0.0%	0.0%	0.0%
Enterococcus spp.	0.7% 3	0.0%	0.2% 1	0.0%	0.7% 3	4.2% 11	3.1%	1.5%	0.0%	0.0%



#### **MIC Distributions**

Table 94a, Distribution of MICs and Occurrence among Enterococcus faecalis Isolates, 2012

Antimicrobial Class	Antimicrobial Agent	Isolate Source (# of Isolates)	%l¹	%R²	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	Dist 2	ribution 4	(%) of N 8	IICs (µg/ 16	ml) <sup>4</sup> 32	64	128	256	512	1024	2048	>2048
Aminoglycosides	Gentamicin	Retail Chickens (204)	N/A	29.4	[23.3 - 36.2]														67.8	2.9		3.9	25.5	
			-																					
		Retail Ground Turkey (384)	N/A	32.6	[27.9 - 37.5]														67.2	0.3	0.3		32.3	
		Retail Ground Beef (277)	N/A	0.0	[0.0 - 1.3]														100.0					
		Retail Pork Chops (350)	N/A	1.7	[0.6 - 3.7]														98.0	0.3		0.9	0.9	
	Kanamycin	ਵ ਲੁੱਤ Retail Chickens (204)	N/A	34.8	[28.3 - 41.8]														64.2	0.5	0.5	2.0	32.8	
		हुँ Retail Ground Turkey (384)	N/A	38.5	[33.6 - 43.6]														60.9	0.3	0.3	0.3	38.3	
		Retail Ground Beef (277)	N/A	0.0	[0.0 - 1.3]														64.8	25.3	4.4	2.2	3.3	
		Retail Pork Chops (350)	N/A	2.0	[0.8 - 4.1]														98.0				2.0	
	Streptomycin	g egy Retail Chickens (204)	N/A	17.6	[12.7 - 23.6]																82.4	0.5	1.0	16.2
		Retail Ground Turkey (384)	N/A	20.6	[16.6 - 25.0]																79.4		0.5	20.1
		Retail Ground Beef (277)	N/A	1.8	[0.6 - 4.2]																98.2		1.1	0.7
		Retail Pork Chops (350)	N/A	4.0	[2.2 - 6.6]																96.0		1.1	2.9
Glycopeptides	Vancomycin	Retail Chickens (204)	0.0	0.0	[0.0 - 1.8]						1.0	52.9	46.1											
		Retail Ground Turkey (384)	0.0	0.0	[0.0 - 1.0]						0.3	65.4	33.3	1.0										
		Retail Ground Beef (277)	0.0	0.0	[0.0 - 1.3]						0.4	54.5	44.4	0.7										
		Retail Pork Chops (350)	0.0	0.0	[0.0 - 1.0]						0.6	62.9	35.4	1.1										
	Tigecycline	हु हु Retail Chickens (204)	N/A	0.0	[0.0 - 1.8]			28.4	53.9	17.6														
		Retail Ground Turkey (384)	N/A	0.0	[0.0 - 1.0]		0.3	9.1	71.3	19.3														
		Retail Ground Beef (277)	N/A	0.0	[0.0 - 1.3]		1.1	42.2	36.5	20.2														
		Retail Pork Chops (350)	N/A	0.0	[0.0 - 1.0]			15.1	64.6	20.3														
Lincosamides	Lincomycin	ဖို့ ခွဲ Retail Chickens (204) ပ	0.0	99.0	[96.5 - 99.9]							1.0				99.0								
		Retail Ground Turkey (384)	0.3	98.7	[97.0 - 99.6]							1.0		0.3		98.7								
		Retail Ground Beef (277)	0.0	98.9	[96.9 - 99.8]							1.1				98.9								
		Retail Pork Chops (350)	0.0		[95.9 - 99.2]							2.0				98.0								

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

395% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

4The unshaded areas indicate the dilution range of the Sensititre plates used to test isolates. Single vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

Data not presented as *E. faecalis* is considered intrinsically resistant to Quinupristin-Dalfopristin

Table 94b. Distribution of MICs and Occurrence among Enterococcus faecalis Isolates, 2012

Table 94b. Distribu	tion of wiles and O	ccurrence among <i>En</i>	eroc	occus	Taecalis	isolat	tes, 20	J12						alla cont	(0/)	110- <i>'</i>	n4							
Antimicrobial Class	Antimicrobial Agent	Isolate Source (# of Isolates)	%l <sup>1</sup>	%R²	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	Dist 2	ribution 4	(%) of N 8	IICs (µg. 16	/ml)⁴ 32	64	128	256	512	1024	2048	>2048
Lipopeptides	Daptomycin	g																						
		Retail Chickens (204)	N/A	0.0	[0.0 - 1.8]						3.4	54.4	40.7	1.5										
		Retail Ground Turkey (384)	N/A	0.0	[0.0 - 1.0]					8.0	3.9	58.1	35.9	1.3										
		Retail Ground Beef (277)	N/A	98.9	[96.9 - 99.8]					0.4	2.5	49.1	45.8	2.2										
		Retail Pork Chops (350)	N/A	0.0	[0.0 - 1.0]					1.4	2.3	41.1	52.3	2.9										
Macrolides	Erythromicin	Retail Chickens (204)	44.1	34.3	[27.8 - 41.3]					16.2	5.4	28.4	14.7	1.0		34.3								
		왕 Retail Ground Turkey (384)	32.3	37.0	[32.1 - 42.0]					25.3	5.5	18.2	13.8	0.3		37.0								
		Retail Ground Beef (277)	72.5	0.0	[0.0 - 1.3]					17.0	10.5	46.9	23.8	1.8										
		Retail Pork Chops (350)	74.6	5.1	[3.1 - 8.0]					8.3	12.0	44.9	22.0	7.7	0.3	4.9								
	Tylosin	Retail Chickens (204)	0.0	34.3	[27.8 - 41.3]						0.5	10.3	52.9	2.0				34.3						
		Retail Ground Turkey (384)	0.0	37.0	[32.1 - 42.0]							10.9	48.2	3.9				37.0						
		Retail Ground Beef (277)	0.0	0.0	[0.0 - 1.3]						0.4	7.2	91.3	1.1										
		Retail Pork Chops (350)	3.9	5.1	[3.1 - 8.0]						1.9	3.9	11.5	44.2	34.6	3.9								
Nitrofurans	Nitrofurantoin	Retail Chickens (204)	3.4	0.0	[0.0 - 1.8]										33.8	60.8	2.0	3.4						
		Retail Ground Turkey (384)	1.8	0.0	[0.0 - 1.0]										39.8	57.3	1.0	1.8						
		Retail Ground Beef (277)	0.0	0.0	[0.0 - 1.3]									0.4	25.6	73.6	0.4							
		Retail Pork Chops (350)	0.0	0.3	[0.0 - 1.6]										37.4	62.3			0.3					
Oxazolidinones	Linezolid	용한 Retail Chickens (204) 당당	0.0	0.0	[0.0 - 1.8]							49.5	50.5											
		Retail Ground Turkey (384)	0.3	0.0	[0.0 - 1.0]						0.3	52.3	47.1	0.3										
		Retail Ground Beef (277)	0.0	0.0	[0.0 - 1.3]						0.7	30.7	68.6											
		Retail Pork Chops (350)	0.0	0.0	[0.0 - 1.0]							36.3	63.7											
Penicillins	Penicillin	Retail Chickens (204)	N/A	0.0	[0.0 - 1.8]							1.0	17.6	80.9	0.5									
		Retail Ground Turkey (384)	N/A	0.3	[0.0 - 1.4]							2.1	21.6	76.0		0.3								
		Retail Ground Beef (277)	N/A	0.0	[0.0 - 1.3]								22.7	76.9	0.4									
		Retail Pork Chops (350)	N/A	0.0	[0.0 - 1.0]							1.4	28.3	70.3										

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

Percent of isolates with resistance. Discrepancies between %x and sums or distribution % a are due to rounding. Percent (7s) increasceptible is reported fault and fault and fault and sums or distribution and sums or distr

Table 94c. Distribution of MICs and Occurrence among Enterococcus faecalis Isolates, 2012

Antimicrobial Class	Antimicrobial Agent	Isolate Source (# of Isolates)		%R²	[95% CI] <sup>3</sup>	0.015 0.03	0.125 0.	25 0.5	50 1		Distribu 2		o) of M 8	ICs (µg/ 16	ml) <sup>4</sup> 32	64	128	256	512	1024	2048 >20
Phenicols	Chloramphenicol	Retail Chickens (204)	4.4	0.0	[0.0 - 1.8]						3	3.9	91.7	4.4							
		Retail Ground Turkey (384)	5.0	0.3	[0.0 - 1.4]						2	2.6	92.2	5.0		0.3					
		Retail Ground Beef (277)	0.0	0.0	[0.0 - 1.3]						3	3.6	96.4								
		Retail Pork Chops (350)	0.3	2.3	[1.0 - 4.5]						4	1.0	93.4	0.3	0.6	1.7					
Quinolones	Ciprofloxacin	Retail Chickens (204)	46.1	0.0	[0.0 - 1.8]			0.	5 53.	.4 4	46.1										
		Retail Ground Turkey (384)	43.8	0.0	[0.0 - 1.0]			1.	3 54.	.9 4	43.8										
		Retail Ground Beef (277)	50.9	1.1	[0.2 - 3.1]			1.	1 46.	.9 5	50.9 1	.1									
		Retail Pork Chops (350)	42.9	0.3	[0.0 - 1.6]			4.	9 52.	.0 4	42.9 0	).3									
Streptogramins	Quinupristin-Dalfopristin <sup>5</sup>	Retail Chickens (204)	N/A	N/A	N/A																
		Retail Ground Turkey (384)	N/A	N/A	N/A																
		Retail Ground Beef (277)	N/A	N/A	N/A																
		Retail Pork Chops (350)	N/A	N/A	N/A																
Tetracyclines	Tetracycline	Retail Chickens (204)	0.0	56.9	[49.8 - 63.8]				42.	.6	0.5			0.5	4.4	52.0					
		Retail Ground Turkey (384)	1.6	88.8	[85.2 - 91.8]				8.9	9	O	0.8	1.6		2.1	86.7					
		Retail Ground Beef (277)	0.0	21.7	[17.0 - 27.0]				77.	.6	0.4			0.4	1.8	19.9					
		Retail Pork Chops (350)	0.3	81.7	[77.3 - 85.6]				17.	.7	0.3		0.3		4.0	77.7					

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

<sup>&</sup>lt;sup>3</sup>95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup>The unshaded areas indicate the dilution range of the Sensititre plates used to test isolates. Single vertical lines indicate the breakpoints for susceptibility, while double vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

Data not presented as *E. faecalis* is considered intrinsically resistant to Quinupristin-Dalfopristin

Table 95a. Distribution of MICs and Occurrence among Enterococcus faecalis Isolates, 2013

Antimicrobial Class	Antimicrobial Agent	Isolate Source (# of Isolates)	%l <sup>1</sup>	%R²	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	Dist	ribution 4	(%) of I 8	/IICs (µg/ 16	ml)⁴ 32	64	128	256	512	1024	2048	>2048
Aminoglycosides	Gentamicin	Retail Chickens (202)	N/A	24.3	[18.5 - 30.8]														75.2	0.5	0.5	1.0	22.8	
		중 Cecal (35)	N/A	45.7	[28.8 - 63.4]														54.3			2.9	42.9	
		Retail Ground Turkey (407)	N/A	33.7	[29.1 - 38.5]														66.1	0.3	0.5	0.7	32.4	
		E Cecal (26)	N/A	38.5	[20.2 - 59.4]														61.5	0.5	0.5	0.7	38.5	
		Retail Ground Beef (304)	N/A	0.7	[0.1 - 2.4]														99.3		0.7		30.3	
		Cecal (Beef) (36)	N/A	2.8	[0.1 - 2.4]														97.2		0.7		2.8	
		Cecal (Dairy) (54)	N/A	0.0	[0.0 - 6.6]														100.0					
		Retail (328)	N/A	0.9	[0.2 - 2.6]														98.8	0.3		0.6	0.3	
		Cecal (Market Hogs) (55) Cecal (Sows) (66)	N/A N/A	9.1 16.7	[3.0 - 20.0] [8.6 - 27.9]														89.1 81.8	1.8 1.5	3.6	3.6 7.6	1.8 9.1	
	Kanamycin	Retail Chickens (202)	N/A	26.7	[20.8 - 33.4]														72.8	1.0	0.5		26.7	
	rananyon	등 Cecal (35)	N/A	48.6	[31.4 - 66.0]														51.4		0.0		48.6	
			-																					
		Retail Ground Turkey (407)	N/A	42.8	[37.9 - 47.7]														56.0	0.3	1.0		42.8	
			N/A	42.3	[23.4 - 63.1]														61.5				38.5	
		Retail Ground Beef (304)  Cecal (Beef) (36)	N/A N/A	2.3 5.6	[0.9 - 4.7] [0.7 - 18.7]														97.7 94.4				2.3 5.6	
		Cecal (Dairy) (54)	N/A	1.9	[0.0 - 9.9]														98.2				1.8	
		Retail (328)	N/A	2.7	[1.3 - 5.1]														97.3				2.7	
		Cecal (Market Hogs) (55)	N/A	21.8	[11.8 - 35.0]														76.4	1.8			21.8	
		Cecal (Sows) (66)	N/A	39.4	[27.6 - 52.2]														60.6			1.5	37.9	
	Streptomycin	Retail Chickens (202)	N/A	17.3	[12.4 - 23.3]																82.7	0.5	1.0	15.8
		ਓ Cecal (35)	N/A	11.4	[3.2 - 26.7]																88.6		2.9	8.6
		Retail Ground Turkey (407)	N/A	26.0	[21.8 - 30.6]																74.0	0.5	1.0	24.6
		Cecal (26)	N/A	30.8	[14.3 - 51.8]																69.2		3.9	26.9
		Retail Ground Beef (304)	N/A	3.6	[1.8 - 6.4]																96.4		1.0	2.6
		Cecal (Beef) (36) Cecal (Dairy) (54)	N/A N/A	5.6 1.9	[0.7 - 18.7] [0.0 - 9.9]																94.4 98.2			5.6 1.8
		D-1-7 (000)	N/A	4.9	[2.8 - 7.8]																95.1	0.3	0.9	3.7
		Retail (328)  Cecal (Market Hogs) (55)	N/A	27.3	[16.1 - 41.0]																72.7			27.3
		Cecal (Sows) (66)	N/A	27.3	[17.0 - 39.6]																72.7	3.0	3	21.2
Glycopeptides	Vancomycin	Retail Chickens (202)	0.0	0.0	[0.0 - 1.8]						0.5	71.3	27.7	0.5										
		ිපි Cecal (35)	0.0	0.0	[0.0 - 10.0]							65.7	34.3											
		Retail Ground Turkey (407)	0.0	0.0	[0.0 - 0.9]							73.0	26.3	0.7										
		Cecal (26)	0.0	0.0	[0.0 - 13.2]							69.2	30.8											
		Retail Ground Beef (304)	0.0	0.0	[0.0 - 1.2]							55.9	43.1	1.0										
		Cecal (Beef) (36)	2.8	0.0	[0.0 - 9.7]						2.7	52.8	44.4	1.0	2.8									
		Cecal (Dairy) (54)  Retail (328)	0.0	0.0	[0.0 - 6.6]						3.7	48.2 66.8	46.3 32.0	1.8 0.9	0.3									
		Cecal (Market Hogs) (55)	0.0	0.0	[0.0 - 1.1]							70.9	27.3	1.8	0.3									
		Cecal (Sows) (66)	0.0	0.0	[0.0 - 5.4]							90.9	9.1											
	Tigecycline	Retail Chickens (202)	N/A	0.0	[0.0 - 1.8]			39.1	50.0	10.9														
		증 Cecal (35)	N/A	0.0	[0.0 - 10.0]			14.3	60.0	25.7														
		Retail Ground Turkey (407)	N/A	0.0	[0.0 - 0.9]		0.7	22.4	60.0	17.0														
		은 Cecal (26)	N/A	0.0	[0.0 - 13.2]			11.5	76.9	11.5														
		Retail Ground Beef (304)	N/A	0.0	[0.0 - 1.2]		1.0	58.2	34.5	6.3														
		Cecal (Beef) (36)	N/A	0.0	[0.0 - 9.7]			47.2	36.1	16.7														
		Cecal (Dairy) (54)	N/A	0.0	[0.0 - 6.6]		7.4	55.5	31.5	5.6														
		Retail (328)  Cecal (Market Hogs) (55)	N/A N/A	0.0	[0.0 - 1.1] [0.0 - 6.5]		0.3 1.8	21.7 29.1	64.3 58.2	13.7 10.9														
		တ် Cecal (Sows) (66)	N/A	0.0	[0.0 - 5.4]		1.5	31.8	60.6	6.1														
Lincosamides	Lincomycin	Retail Chickens (202)	0.0	100.0	[98.2 - 100.0]											100.0								
		ිප් Cecal (35)	0.0	100.0	[90.0 - 100.0]											100.0								
		Retail Ground Turkey (407)	0.0	99.8	[98.6 - 100.0]							0.3				99.7								
		되고 Cecal (26)	0.0	100.0	[86.8 - 100.0]											100.0								
		Retail Ground Beef (304)	0.0	96.7	[94.0 - 98.4]							3.3			0.3	96.4								
		Cecal (Beef) (36)	0.0	100.0	[90.3 - 100.0]											100.0								
		Cecal (Dairy) (54)	0.0	98.1	[90.1 - 100.0]							1.8				98.2								
		Retail (328)	0.0	99.4 100.0	[97.8 - 99.9] [93.5 - 100.0]							0.6				99.4 100.0								
		Cecal (Market Hogs) (55) Cecal (Sows) (66)	0.0	100.0	[94.6 - 100.0]											100.0								

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with intermediate breakpoint established.

Percent of isolates with intermediate breakpoint established.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

395% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

The unshaded areas indicate the dilution range of the Sensitive plates used to test isolates. Single vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

Data not presented as *E. faecalis* is considered intrinsically resistant to Quinupristin-Dalfopristin

Table 95b. Distribution of MICs and Occurrence among Enterococcus faecalis Isolates, 2013

		Isolate Source														MICs (µg							
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.015	0.03	0.06 0	125 0.2	:5 (	0.50	1	2	4	8	16	32	64	128	256	512	1024	2048 >204
Lipopeptides	Daptomycin	Retail Chickens (202)	N/A	0.0	[0.0 - 1.8]						4.0	54.5	40.6	1.0									
		ਤੋਂ Cecal (35)	N/A	0.0	[0.0 - 10.0]							68.6	31.4										
		Retail Ground Turkey (407)	N/A	0.0	[0.0 - 0.9]				0.3	3	1.7	66.1	30.7	1.2									
		를 Cecal (26)	N/A	0.0	[0.0 - 13.2]							80.8	19.2										
		Retail Ground Beef (304)	N/A	0.0	[0.0 - 1.2]				0.7	7	3.0	61.2	33.9	1.3									
		Cecal (Beef) (36)	N/A	0.0	[0.0 - 9.7]						2.8	30.6	58.3	8.3									
		Cecal (Dairy) (54)	N/A	1.9	[0.0 - 9.9]							33.3	55.6	9.3	1.8								
		Retail (328)	N/A N/A	0.0	[0.0 - 1.1]				1.2	2	1.5	54.9	40.6	1.8									
		Cecal (Market Hogs) (55) Cecal (Sows) (66)	N/A	0.0	[0.0 - 6.5] [0.0 - 5.4]							38.2 63.6	54.5 24.2	7.3 12.1									
Macrolides	Erythromicin	Retail Chickens (202)	40.6	35.1	[28.6 - 42.2]				19.	3	5.0	23.3	17.3			35.2							
madi dirada	Liyanomon	Cecal (35)	54.3	37.1	[21.5 - 55.1]				2.9		5.7	22.9	31.4			37.1							
			25.4																				
		Retail Ground Turkey (407)	35.4 38.4	39.3	[34.5 - 44.2]				19.		5.6	21.1	14.0	0.3	0.3	39.1							
		E Cecal (26)	-	42.3	[23.4 - 63.1]				19.	.2		19.2	19.2			42.3							
		Retail Ground Beef (304)	69.1 69.5	3.0	[1.4 - 5.5]				19.		8.2	40.5	23.7	4.9		3.0							
		Cecal (Beef) (36) Cecal (Dairy) (54)	66.7	11.1 3.7	[3.1 - 26.1] [0.5 - 12.7]				8.3 18.		11.1	27.8 31.5	41.7 33.3	1.9		11.1 3.7							
		Retail (328)	73.5	7.0	[4.5 - 10.3]				8.5		11.0	42.4	25.3	5.8	0.3	6.7							
		Cecal (Market Hogs) (55)	32.7	52.7	[38.8 - 66.3]				5.5		9.1	21.8	10.9			52.7							
		Cecal (Sows) (66)	36.4	53.0	[40.3 - 65.4]				9.1	1	1.5	27.3	9.1			53.0							
	Tylosin	Retail Chickens (202)	0.0	35.1	[28.6 - 42.2]						0.5	6.4	55.0	3.0				35.2					
		당 Cecal (35)	0.0	48.6	[31.4 - 66.0]							5.7	57.1					37.1					
		Retail Ground Turkey (407)	0.3	39.1	[34.3 - 44.0]							9.8	48.9	2.0		0.3		39.1					
		Cecal (26)	0.0	42.3	[23.4 - 63.1]							3.8	50.0	3.8		0.0		42.3					
		Retail Ground Beef (304)	0.0	3.0	[1.4 - 5.5]							10.2	85.2	1.6				3.0					
		Cecal (Beef) (36)	0.0	11.1	[3.1 - 26.1]							2.8	86.1	1.0				11.1					
		Cecal (Dairy) (54)	0.0	3.7	[0.5 - 12.7]							3.7	85.2	5.6	1.8			3.7					
		Retail (328)	0.0	7.0	[4.5 - 10.3]						0.6	7.6	82.6	2.1				7.0					
		Cecal (Market Hogs) (55)	0.0	52.7	[38.8 - 66.3]							3.6	43.6					52.7					
		Cecal (Sows) (66)	0.0	53.0	[40.3 - 65.4]							7.6	39.4				<u> </u>	53.0	ı				
Nitrofurans	Nitrofurantoin	Retail Chickens (202)	4.5 0.0	0.0	[0.0 - 1.8]									0.5	31.7	61.4	2.0	4.5					
		ਓ Cecal (35)	_	0.0	[0.0 - 10.0]										40.0	57.1	2.9						
		Retail Ground Turkey (407)	1.2	0.0	[0.0 - 0.9]										43.0	55.0	0.7	1.2					
		토 Cecal (26)	0.0	0.0	[0.0 - 13.2]										69.2	30.8							
		Retail Ground Beef (304)	0.0	0.0	[0.0 - 1.2]								0.3		33.2	66.1	0.3						
		Cecal (Beef) (36)	0.0	0.0	[0.0 - 9.7]										38.9	61.1							
		Cecal (Dairy) (54)	3.7	0.0	[0.0 - 6.6]										35.2	61.1		3.7					
		Retail (328)  Cecal (Market Hogs) (55)	0.0	0.0	[0.0 - 1.1] [0.0 - 6.5]										33.8 36.4	65.9 61.8	0.3 1.8						
		Cecal (Sows) (66)	0.0	0.0	[0.0 - 5.4]										45.5	54.5							
Oxazolidinones	Linezolid	Retail Chickens (202)	0.5	0.0	[0.0 - 1.8]						1.0	44.1	54.5	0.5									
			0.0	0.0	[0.0 - 10.0]							54.3	45.7										
			-								0.7		48.9										
		Retail Ground Turkey (407)	0.0	0.0	[0.0 - 0.9] [0.0 - 13.2]						3.9	50.4 53.8	42.3										
		. ,	-																				
		Retail Ground Beef (304)  Cecal (Beef) (36)	0.0	0.0	[0.0 - 1.2] [0.0 - 9.7]						0.3	23.4 36.1	76.3 63.9										
		Cecal (Dairy) (54)	0.0	0.0	[0.0 - 6.6]							38.9	61.1										
		Retail (328)	0.0	0.0	[0.0 - 1.1]							32.6	67.4										
		Cecal (Market Hogs) (55)	0.0	0.0	[0.0 - 6.5]							54.5	45.5										
		Cecal (Sows) (66)	0.0	1.5	[0.0 - 8.2]						1.5	53.0	43.9			1.5							
Penicillins	Penicillin	Retail Chickens (202)	N/A	0.0	[0.0 - 1.8]							0.5	25.3	74.3									
		ਨ Cecal (35)	N/A	0.0	[0.0 - 10.0]								28.6	71.4									
		Retail Ground Turkey (407)	N/A	0.0	[0.0 - 0.9]						0.3	3.0	29.7	66.8	0.3								
		E Cecal (26)	N/A	0.0	[0.0 - 13.2]								34.6	65.4									
		Retail Ground Beef (304)	N/A	0.0	[0.0 - 1.2]								28.3	71.7									
		Cecal (Beef) (36)	N/A	0.0	[0.0 - 9.7]								8.3	91.7									
		Cecal (Dairy) (54)	N/A	0.0	[0.0 - 6.6]							1.8	5.6	92.6									
		Retail (328)	N/A	0.0	[0.0 - 1.1]							0.6	33.2	66.2									
		Cecal (Market Hogs) (55) Cecal (Sows) (66)	N/A N/A	0.0	[0.0 - 6.5] [0.0 - 5.4]								18.2 13.6	81.8 86.4									
		d when there is no intermediate hreal			\$1. 1. W. 1. 1.																		

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

395% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

The unshaded areas indicate the dilution range of the Sensitire plates used to test isolates. Single vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

Data not presented as *E. faecalis* is considered intrinsically resistant to Quinupristin-Dalfopristin

Table 95c. Distribution of MICs and Occurrence among Enterococcus faecalis Isolates, 2013

		ccurrence among Ent				1	-, <u>-</u> -						Dis	tributio	n (%) of	MICs (μ	g/ml) <sup>4</sup>						
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l¹	%R²	[95% CI] <sup>3</sup>	0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024	2048 >2
Phenicols	Chloramphenicol	Retail Chickens (202)	4.5	0.5	[0.0 - 2.7]									4.0	91.1	4.5		0.5					
		Ö Cecal (35)	0.0	0.0	[0.0 - 10.0]									5.7	94.3								
		Retail Ground Turkey (407)	3.0	0.7	[0.2 - 2.1]									6.4	89.9	3.0		0.7					
		포 - Cecal (26)	0.0	0.0	[0.0 - 13.2]									7.7	92.3								
		Retail Ground Beef (304)	0.0	0.3	[0.0 - 1.8]									6.3	93.4			0.3					
		Cecal (Beef) (36)	0.0	2.8	[0.0 - 1.0]									0.5	97.2			2.8					
		Cecal (Dairy) (54)	0.0	0.0	[0.0 - 6.6]									9.3	90.7								
		Retail (328)	0.6	2.1	[0.9 - 4.3]									6.1	91.2	0.6		2.1					
		Cecal (Market Hogs) (55)	1.8	14.5	[6.5 - 26.7]									1.8	81.8			14.6					
		Cecal (Sows) (66)	4.6	21.2	[12.1 - 33.0]										74.2	4.6	6.1	15.1					
Quinolones	Ciprofloxacin	Retail Chickens (202)	33.2	0.5	[0.0 - 2.7]						1.5	64.9	33.2		0.5								
		Ö Cecal (35)	25.7	0.0	[0.0 - 10.0]							74.3	25.7										
		Retail Ground Turkey (407)	33.9	0.0	[0.0 - 0.9]						2.2	63.9	33.9										
		분 Cecal (26)	30.8	0.0	[0.0 - 13.2]							69.2	30.8										
		Retail Ground Beef (304)	39.8	0.0	[0.0 - 1.2]					0.3	2.6	57.2	39.8										
		Cecal (Beef) (36)	61.1	0.0	[0.0 - 9.7]						2.8	36.1	61.1										
		Cecal (Dairy) (54)	61.1	3.7	[0.5 - 12.7]							35.2	61.1		3.7								
		Retail (328)	27.7	0.0	[0.0 - 1.1]						4.0	68.3	27.7										
		Cecal (Market Hogs) (55) Cecal (Sows) (66)	65.5 37.9	0.0	[0.0 - 6.5] [0.0 - 5.4]						1.8	32.7 60.6	65.5 37.9										
	_										1.5	60.6	37.9	U									
Streptogramins	Quinupristin-Dalfopristin <sup>5</sup>	Retail Chickens (202)	N/A	N/A	N/A																		
		ਰ	N/A	N/A	N/A																		
		Retail Ground Turkey (407)	N/A	N/A	N/A																		
		\(\frac{\fin}}}}}}{\frac}}}}}}}}}{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\fin}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}	N/A	N/A	N/A																		
		<sub>ω</sub> Retail Ground Beef (304)	N/A	N/A	N/A																		
		Cecal (Beef) (36)	N/A	N/A	N/A																		
		Cecal (Dairy) (54)	N/A	N/A	N/A																		
		Retail (328)	N/A	N/A	N/A																		
		Cecal (Market Hogs) (55) Cecal (Sows) (66)	N/A N/A	N/A N/A	N/A N/A																		
Tetracyclines	Tetracycline	Retail Chickens (202)	0.0	62.4	[55.3 - 69.1]							36.1	1.5		ī	0.5	4.5	57.4					
retracyclines	rendoyemie	Ö Cecal (35)	0.0	68.6	[50.7 - 83.1]							31.4	1.0			0.0	8.6	60.0					
		O Cecai (35)		00.0	[50.7 - 63.1]							31.4					0.0	60.0					
		Retail Ground Turkey (407)	1.2	87.5	[83.9 - 90.5]							10.3	0.3	0.7	1.2	0.3	3.9	83.3					
		P Cecal (26)	0.0	92.3	[74.9 - 99.1]							7.7				3.8		88.5					
		Retail Ground Beef (304)	0.0	21.4	[16.9 - 26.4]							77.3	1.3			2.0	0.7	18.7					
		Cecal (Beef) (36)	0.0	25.0	[12.1 - 42.2]							75.0					F 0	25.0					
		Cecal (Dairy) (54)	0.0	13.0	[5.4 - 24.9]							87.0	0.2				5.6	7.4					
		Retail (328)  Cecal (Market Hogs) (55)	0.0	82.3 72.7	[77.7 - 86.3] [59.0 - 83.9]							17.4 25.5	0.3 1.8			0.3	7.3 1.8	74.7 70.9					
		Cecal (Sows) (66)	0.0	77.3	[65.3 - 86.7]							21.2	1.5			1.5		75.8					
1 8		d when there is no intermediate brea	to a fact of									_			•	-							

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

2 Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

3 Percent of isolates with resistance. Discrepancies between %R and sums of distribution %?s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

3 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

4 The unshaded areas indicate the dilution range of the Sensitire plates used to test isolates. Single vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers is sted for the breakpoint sized for the breakpoint sized for the breakpoint sized for the breakpoint sized for resistance. Sized for the breakpoint sized f

Table 96a. Antimicrob	ial Resistance amor	ng E	nterococcus faeca												
Year		v)	Potail Chickons	2002 134	2003	2004	<b>2005</b> 116	<b>2006</b> 126	2007	2008	2009	2010	2011	<b>2012</b> 204	2013
Number of Isolates Tested		Chickens	Retail Chickens HACCP <sup>1</sup>	134	188 1285	88 1440	116 1839	126 1150	123 776	165 501	138 418	214 420	186 275	204	202
		Chic	Cecal				.300					-20			35
		keys	Retail Ground Turkey	294	289	260	339	291	261	271	260	369	392	384	407
		Turk	Cecal												26
		9	Retail Ground Beef	210	224	194	226	227	206	202	227	285	269	277	304
		Cattle	Cecal (Beef)												36
		H	Cecal (Dairy)												54
		Swine	Retail Pork Chops Cecal (Market Hogs)	255	313	313	320	301	263	263	259	353	334	350	328
		Ś	Cecal (Narket Hogs) Cecal (Sows)												55 66
	Antimicrobial (Resistance	T	Isolate												
Antimicrobial Class	Breakpoint)		Source												
Aminoglycosides	Gentamicin (MIC >500 µg/ml)	(0	Retail Chickens	22.4% 30	20.2% 38	19.3% 17	18.1% 21	23.0% 29	19.5% 24	19.4% 32	25.4% 35	31.8% 68	26.9% 50	29.4% 60	24.3% 49
	(iiiio rooc pgiiii)	Chickens	HACCP	- 00	25.1%	28.1%	25.8%	27.6%	31.4%	35.9%	32.8%	34.8%	36.7%	00	
		S	Cecal		322	404	475	317	244	180	137	146	101		45.7%
		_		22.1%	27.7%	24.6%	20.1%	22.0%	42.1%	41.3%	30.0%	37.4%	33.7%	32.6%	16 33.7%
		Turkeys	Retail Ground Turkey	65	80	64	68	64	110	112	78	138	132	125	137
		₽	Cecal												38.5% 10
			Retail Ground Beef	2.4% 5	1.8% 4	1.0%	1.8% 4	0.9% 2	0.5% 1	2.0%	0.9%	0.4%	0.0%	0.0%	0.7%
		Cattle	Cecal (Beef)												2.8%
		ű	Cecal (Dairy)												0.0%
		-		2.7%	0.3%	1.9%	1.6%	0.7%	0.8%	0.4%	1.9%	1.4%	0.9%	1.7%	0.9%
		0	Retail Pork Chops	7	1	6	5	2	2	1	5	5	3	6	3
		Swine	Cecal (Market Hogs)												9.1% 5
			Cecal (Sows)												16.7% 11
	Kanamycin		Retail Chickens	32.1%	27.1%	22.7%	26.7%	30.2%	28.5%	29.7%	30.4%	36.0%	33.3%	34.8%	26.7%
	(MIC ≥ 1024 μg/ml)	ens		43	51 35.6%	20 36.4%	31 36.5%	38 37.9%	35 39.7%	49 44.1%	42 35.6%	77 39.8%	62 43.3%	71	54
		Chickens	HACCP		458	524	671	436	308	221	149	167	119		48.6%
		Ĺ	Cecal												17
		eys	Retail Ground Turkey	26.2% 77	36.0% 104	29.6% 77	27.4% 93	32.0% 93	50.2% 131	55.4% 150	35.9% 101	44.7% 165	42.9% 168	38.5% 148	42.8% 174
		Turkeys	Cecal												42.3%
			Retail Ground Beef	1.9%	3.1%	3.1%	4.0%	2.6%	2.0%	4.0%	1.8%	0.7%	1.5%	0.0%	2.3%
		ę		4	7	6	9	6	4	8	4	2	4	0	7 5.6%
		Cattle	Cecal (Beef)												2
			Cecal (Dairy)												1.9% 1
			Retail Pork Chops	4.7% 12	4.8% 15	2.6% 8	3.1% 10	2.3% 7	2.3%	3.0%	2.7% 7	1.7% 6	2.4% 8	2.0%	2.7% 9
		Swine	Cecal (Market Hogs)			- J			Ü	- J				·	21.8%
		Ó	Cecal (Sows)												12 39.4%
	Streptomycin	+-		29.1%	22.9%	18.2%	18.1%	10.3%	17.9%	10.9%	13.0%	15.4%	19.4%	17.7%	26 17.3%
	(MIC ≥ 1000 μg/ml)	sus	Retail Chickens	39	43	16	21	13	22	18	18	33	36	36	35
		Chickens	HACCP		20.7% 266	17.8% 256	21.2% 390	18.6% 214	14.4% 112	17.0% 85	16.7% 70	19.5% 82	21.8% 60		
		ō	Cecal												11.4% 4
		s,	Retail Ground Turkey	24.1%	30.4%	26.9%	21.5%	20.3%	36.4%	39.1%	27.7%	27.9%	19.4%	17.7%	26.0%
		Turkeys	Cecal	71	88	70	73	59	95	106	72	103	108	79	106 30.8%
		F		4.8%	5.4%	7.7%	8.4%	5.7%	4.9%	1.5%	5.3%	1.4%	1.9%	1.8%	3.6%
		m	Retail Ground Beef	10	12	15	19	13	4.9%	3	12	1.4%	1.9%	1.8%	11
		Cattle	Cecal (Beef)												5.6% 2
		1	Cecal (Dairy)												1.9%
			Retail Pork Chops	10.6%	7.3%	9.3%	7.8%	7.6%	8.7%	10.3%	8.9%	6.8%	5.7%	4.0%	4.9%
		ine	Cecal (Market Hogs)	27	23	29	25	23	23	27	23	24	19	14	16 27.3%
		Swine													15 27.3%
		1	Cecal (Sows)			6.51	6.51		6.51	6.51					18
Glycopeptides	Vancomycin (MIC ≥ 32 μg/mI)	S	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	1	Chickens	HACCP		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
		٦.	Cecal		Ü	Ü	Ü	U	U	Ü	U	U	,		0.0%
		10		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys	Retail Ground Turkey	0	0	0	0	0	0	0	0	0	0	0	0.0%
		₽	Cecal												0
			Retail Ground Beef	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)	Ť	Ť	Ť	Ť	Ť	Ť	Ť	Ť	Ť	Ť	Ť	0.0%
		ď	Cecal (Dairy)												0.0%
		$\vdash$		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
			Retail Pork Chops	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		m		U	0	U	U	U	0	U	U	U	U	U	
		Swine	Cecal (Market Hogs)	0	0			0			0			0	0.0%
		Swine		0	0										

Table 96b. Antimicro	bial Resistance amo	ng E	nterococcus faeca												
Year Number of Isolates Tested		St	Retail Chickens	<b>2002</b> 134	<b>2003</b> 188	<b>2004</b> 88	<b>2005</b> 116	<b>2006</b> 126	<b>2007</b> 123	<b>2008</b> 165	<b>2009</b> 138	<b>2010</b> 214	<b>2011</b> 186	<b>2012</b> 204	<b>2013</b> 202
		Chickens	HACCP <sup>1</sup>		1285	1440	1839	1150	776	501	418	420	275		
			Cecal												35
		Turkeys	Retail Ground Turkey Cecal	294	289	260	339	291	261	271	260	369	392	384	407 26
			Retail Ground Beef	210	224	194	226	227	206	202	227	285	269	277	304
		Cattle	Cecal (Beef)	210	224	134	220	221	200	202	221	200	209	211	36
		Ľ	Cecal (Dairy)												54
		Swine	Retail Pork Chops Cecal (Market Hogs)	255	313	313	320	301	263	263	259	353	334	350	328 55
		Ś	Cecal (Narket Hogs)												66
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class Glycylcycline	Breakpoint) Tigecycline		Source Retail Chickens				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
.,,	(MIC ≥ 0.25 µg/ml) <sup>1</sup>	sue					0	0.2%	1.0%	0.0%	0.0%	0.0%	0.0%	0	0
		Chickens	HACCP					2	8	0	0	0	0		0.0%
			Cecal				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%
		Turkeys	Retail Ground Turkey				0.078	0.078	0.076	0.078	0.076	0.078	1	0.078	0
		Τ	Cecal				0.00/	0.004	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.0%
			Retail Ground Beef				0.0%	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0%
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail Pork Chops				0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0%	0.3% 1	0.0% 0	0.0%
		Swine	Cecal (Market Hogs)												0.0%
		"	Cecal (Sows)												0.0%
Lincosamides	Lincomycin		Retail Chickens	99.3%	99.5%	98.9%	99.1%	100.0%	99.2%	100.0%	98.6%	99.1%	98.9%	99.0%	100.0%
	(MIC ≥ 8 μg/mI)	Chickens	HACCP	133	187 99.6%	87 99.4%	99.1%	126 99.7%	122 100.0%	165 99.8%	136 99.0%	212 99.5%	184 99.6%	202	202
		Chic	Cecal		1280	1431	1823	1147	776	500	414	418	274		100.0%
		_		97.3%	99.0%	98.8%	97.3%	98.6%	98.9%	99.3%	97.7%	97.3%	98.5%	98.7%	35 99.8%
		Turkeys	Retail Ground Turkey	286	286	257	330	287	258	269	254	359	386	379	406 100.0%
		ĭ	Cecal												26
			Retail Ground Beef	98.6% 207	96.4% 216	97.4% 189	97.8% 221	97.8% 222	97.6% 201	99.0% 200	97.8% 222	99.0% 282	97.4% 262	98.9% 274	96.7% 294
		Cattle	Cecal (Beef)												100.0% 36
			Cecal (Dairy)												98.2% 53
			Retail Pork Chops	99.2% 253	98.1% 307	94.9% 297	95.3% 305	97.3% 293	97.7% 257	97.3% 256	97.3% 252	97.2% 343	97.0% 324	98.0% 343	99.4% 326
		Swine	Cecal (Market Hogs)	233	307	231	303	293	231	230	232	343	324	343	100.0%
		S	Cecal (Sows)												55 100.0%
Lipopeptides	Daptomycin		Retail Chickens			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	(MIC ≥ 4 μg/mI) <sup>2</sup>	ickens	HACCP			0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0
		Chick				1	0	0	0	0	0	0	0		0.0%
			Cecal			0.00/	0.20/	0.00/	0.00/	0.4%	0.00/	0.00/	0.00/	0.00/	0.0%
		Turkeys	Retail Ground Turkey			0.0%	0.3% 1	0.0%	0.0%	1	0.0%	0.0%	0.0% 0	0.0% 0	0
		Tu	Cecal												0.0%
			Retail Ground Beef			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)												1.9%
			Retail Pork Chops			0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Swine	Cecal (Market Hogs)			0	0	1	0	0	0	0	0	0	0.0%
		Š	Cecal (Sows)												0.0%
Macrolides	Erythromycin			45.5%	43.1%	35.2%	37.1%	34.9%	44.7%	32.7%	39.9%	32.2%	35.5%	34.3%	0 35.1%
	(MIC ≥ 8 μg/mI)	sue	Retail Chickens	61	81	31	43	44	55	54	55	69	66	70	71
		Chickens	HACCP		37.8% 486	35.5% 511	37.8% 696	47.0% 541	38.1% 296	48.5% 243	40.9% 171	42.4% 178	39.6% 109		0= ::
		Ľ	Cecal												37.1% 13
		Turkeys	Retail Ground Turkey	31.0% 91	43.6% 126	33.8% 88	38.3% 130	47.1% 137	48.7% 127	51.7% 140	37.7% 98	40.4% 149	47.2% 185	37.0% 142	39.3% 160
		Tur	Cecal												42.3% 11
			Retail Ground Beef	1.4%	4.9% 11	3.6% 7	4.4% 10	4.0% 9	2.4%	2.5% 5	2.6%	0.7% 2	3.0% 8	0.0%	3.0%
		Cattle	Cecal (Beef)	3		,	10	-	3	,	0				11.1%
		٥	Cecal (Dairy)												3.7%
		$\vdash$	Retail Pork Chops	9.0%	7.0%	9.9%	5.9%	6.6%	9.1%	8.0%	6.9%	4.5%	4.5%	5.1%	7.0%
		ne		23	22	31	19	20	24	21	18	16	15	18	23 52.7%
		Swin	Cecal (Market Hogs)												29
		1	Cecal (Sows)												35

<sup>&</sup>lt;sup>2</sup> Percent non-susceptible is reported rather than percent resistance as no CLSI breakpoint has been established. NARMS breakpoint established to determine resistance.

Table 96c. Antimicrobial Resistance among Enterococcus faecalis Isolates, 2002-2013 2006 2010 2012 2003 2004 2005 2007 2008 2009 2011 2013 Year 2002 Retail Chicken 123 214 116 186 Number of Isolates Tested 1285 1440 1839 1150 776 501 418 420 275 HACCP 35 Retail Ground Turkey 289 260 339 291 261 271 260 369 392 384 407 294 Cecal 26 Retail Ground Reef 210 224 194 226 227 206 202 227 285 269 277 304 Cattle Cecal (Beef) 36 Cecal (Dairy) 54 Retail Pork Chops 255 313 313 320 301 263 263 259 353 334 350 328 Cecal (Market Hogs) 55 Cecal (Sows) 66 (Resistance Breakpoint) lenlate Antimicrobial Class Source 32.7% 32.4% 48.5% 42.6% 34.1% 37.1% 36.5% 44.7% 39.9% 34.3% 35.1% 35.5% Retail Chickens (MIC ≥ 32 μg/ml) 80 66 71 37.6% 48.2% 43.3% 38.8% 38.5% 38.3% 41.6% 39.6% HACCP 499 541 708 554 297 244 174 182 109 48.6% Cecal 32.0% 43.9% 34.6% 38.3% 47.1% 49.4% 51.3% 37.7% 37.0% 39.1% 40.4% 47.2% Retail Ground Turkey 129 159 Cecal 42.3% 1 9% 4 9% 3.6% 5.8% 4.0% 2.4% 3.0% 2.2% 0.7% 3.0% 0.0% 3.0% Retail Ground Beef 13 9 11 1% Cecal (Beef) 3.7% Cecal (Dairy) 7 0% 9.0% 7.0% 9.9% 6.3% 7.3% 9.1% 7.6% 6.6% 4.5% 4.8% 5.1% Retail Pork Chops 23 22 31 20 22 24 20 17 16 16 18 23 52.7% Cecal (Market Hogs) 29 53.0% Cecal (Sows) 35 Nitrofurans Vitrofurantoin Retail Chickens 0.7% 1.1% 1.1% 4.3% 0.0% 0.0% 1.2% 0.0% 0.0% 0.5% 0.0% 0.0% (MIC ≥ 128 µg/ml) 0.2% 1.0% 1.0% 1.0% 0.2% 3.3% 1.0% 0.5% 1.0% HACCP 14 10 12 Cecal 0.0% 2.0% 1.4% 1.2% 2.4% 0.0% 0.0% 0.0% 0.4% 0.0% 0.0% 0.0% 0.0% Retail Ground Turkey 0.0% Cecal 0.0% 0.0% 0.0% 0.9% 0.0% 0.0% 0.5% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Ground Beef 0.0% Cecal (Beef) 0 0.0% Cecal (Dairy) 0 0.0% 0.0% 0.3% 0.3% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.3% 0.0% Retail Pork Chops 0 0.0% Cecal (Market Hogs) 0 0.0% Cecal (Sows) 0 Oxazolidinones Linezolio 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Chickens (MIC ≥ 8  $\mu$ g/mI) 0.0% 0.0% 0.0% HACCP 0.0% 0.0% 0.0% O 0 0 0.0% Cecal 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Ground Turkey 0.0% 0.0% 0.0% 0.0% Cecal 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Ground Reef 0 0.0% Cecal (Beef) 0.0% Cecal (Dairy) 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Pork Chops 0 0.0% Cecal (Market Hogs) 0 1.5% Cecal (Sows) Penicillins 0.0% Retail Chickens 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.5% 0.0% 0.0% (MIC ≥ 16 µg/ml) 0.9% 0.4% 0.1% 0.6% 0.2% 0.5% 1.5% 0.2% 0.2% HACCP 13 0.0% Cecal 0.0% 0.3% 0.0% 0.0% 1.5% 0.0% 0.0% 0.0% 0.3% 0.0% 0.3% 0.0% Retail Ground Turkey 0 0.0% Cecal 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.4% 0.0% 0.0% 0.0% 0.0% Retail Ground Beef 0 0.0% Cecal (Reef) 0 0.0% Cecal (Dairy) 0.0% 0.0% 0.0% 1.3% 0.0% 0.0% 0.4% 0.4% 0.3% 0.0% 0.0% 0.0% Retail Pork Chops 0

<sup>1</sup> In 2012 and 2013, chicken carcass rinsates were not sampled for *Enterococcus* 

Cecal (Market Hogs)

0.0%

0.0%

Table 96d. Antimicrob	ial Resistance amon	ng E	nterococcus faeca	lis Isola	tes, 200	2-2013	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		sus	Retail Chickens	134	188	88	116	126	123	165	138	214	186	2012	2013
		Chickens	HACCP <sup>1</sup>		1285	1440	1839	1150	776	501	418	420	275		35
		eys C	Cecal  Retail Ground Turkey	294	289	260	339	291	261	271	260	369	392	384	35 407
		Turk	Cecal	234	203	200	333	231	201	2/1	200	509	332	304	26
		He	Retail Ground Beef	210	224	194	226	227	206	202	227	285	269	277	304
		Cattle	Cecal (Beef) Cecal (Dairy)												36 54
		e e	Retail Pork Chops	255	313	313	320	301	263	263	259	353	334	350	328
		Swine	Cecal (Market Hogs) Cecal (Sows)												55 66
	Antimicrobial (Resistance		Isolate												- 50
Antimicrobial Class	Breakpoint)	<u> </u>	Source	0.00:	0.00	0.00	0.00:	0.00:	0.00	0.00	4.40*	0.00	0.00:	0.00	0.55
Phenicols	Chloramphenicol (MIC ≥ 32 µg/ml)	ns	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%	0.9%	0.0%	0.0%	0.5% 1
		Chickens	HACCP		0.2% 2	0.1% 1	0.1% 1	0.3% 4	0.5% 4	0.4% 2	0.2% 1	0.0%	0.7% 2		
			Cecal												0.0% 0
		Turkeys	Retail Ground Turkey	0.3% 1	0.0%	0.0%	0.0%	0.0%	0.8% 2	0.4%	0.0%	0.3%	0.3% 1	0.3% 1	0.7% 3
		ŢīŢ	Cecal												0.0%
			Retail Ground Beef	0.0%	0.0%	0.0%	0.4%	1.3%	1.0%	0.0%	0.0%	0.7%	0.7% 2	0.0%	0.3%
		Cattle	Cecal (Beef)												2.8%
			Cecal (Dairy)												0.0%
		$\vdash$	Retail Pork Chops	0.4%	1.0%	0.6%	1.3%	1.0%	0.4%	0.4%	1.2%	0.0%	0.9%	2.3%	2.1%
		Swine	Cecal (Market Hogs)	1	3	2	4	3	1	1	3	0	3	8	14.6%
		ś	Cecal (Sows)												8 21.2%
Quinolones	Ciprofloxacin	+	Retail Chickens	0.0%	0.0%	8.0%	0.9%	0.8%	0.0%	3.0%	0.0%	0.0%	0.0%	0.0%	14 0.5%
	(MIC ≥ 4 μg/mI)	sues		0	0	7	0.3%	3.3%	0.6%	5	0.0%	0.2%	0	0	1
		Chickens	HACCP		3	16	6	38	5	5	0.078	1	5		0.0%
			Cecal	0.3%	0.0%	5.8%	2.4%	0.7%	0.0%	3.3%	0.8%	0.0%	0.3%	0.0%	0.0%
		Turkeys	Retail Ground Turkey	1	0.0%	15	8	2	0.0%	9	0.8%	0.0%	1	0.0%	0.0%
		12	Cecal	0 =1	0	40 -	0 =1	0 = 1	0.50		4 = 1 :	0.11	0 = 1	4 ***	0
		_	Retail Ground Beef	0.0%	0.4%	12.9% 25	0.9% 2	0.0%	0.0%	4.0% 8	1.3%	0.4% 1	0.0%	1.1% 3	0.0%
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)												3.7% 2
			Retail Pork Chops	1.2% 3	0.0%	6.1% 19	2.5% 8	0.3% 1	0.0%	4.6% 12	1.5% 4	0.0%	0.3% 1	0.3%	0.0%
		Swine	Cecal (Market Hogs)												0.0%
			Cecal (Sows)												0.0%
Streptogramins	Quinupristin-Dalfopristin (MIC ≥ 4 µg/mI) <sup>2</sup>	1.	Retail Chickens	-	-	-	-	-	-	-	-	-	-	-	-
	,ο = ¬ μg/IIII)	ickens	HACCP		-	-	-	-	-	-	-	-	-	-	-
		Chick	Cecal												-
		s,	Retail Ground Turkey	-	-	-	-	-	-	-	-	-	-	-	
		Turkeys	Cecal												-
		Ë	Retail Ground Beef	-	-	-	-	-	-	-	-	-	-	-	<del>  .</del>
		a E	Cecal (Beef)												
		Cattle													<u> </u>
		$\vdash$	Cecal (Dairy)												<u> </u>
		Эe	Retail Pork Chops	-		-	-	-	-	-	-	-	-	-	-
		Swine	Cecal (Market Hogs)												-
Totrocyclin	Tatana a sali	-	Cecal (Sows)	07.00	00.00	00.551	75.000	70.00	05.53	00.45	70.50	70 (**	00.45	F0.531	- 00.40/
Tetracyclines	Tetracycline (MIC ≥ 16 μg/ml)	SU	Retail Chickens	67.2% 90	68.6% 129	63.6% 56	75.0% 87	70.6% 89	65.9% 81	69.1% 114	72.5% 100	72.4% 155	63.4% 118	56.9% 116	62.4% 126
		Chickens	HACCP		76.2% 979	78.7% 1133	74.8% 1375	80.3% 924	74.7% 580	79.4% 398	80.1% 335	82.4% 346	78.5% 216		
		٥	Cecal												68.6% 24
		eys	Retail Ground Turkey	85.0% 250	87.9% 254	88.1% 229	84.4% 286	85.9% 250	94.3% 246	90.0% 244	85.8% 223	87.8% 324	92.4% 362	88.8% 341	87.5% 356
		Turkeys	Cecal												92.3% 24
			Retail Ground Beef	18.6% 39	20.5% 46	25.3% 49	34.1% 77	22.5% 51	32.5% 67	31.7% 64	21.1% 48	16.5% 47	18.2% 49	22.0% 61	21.4% 65
		Cattle	Cecal (Beef)	33	70	73		31	37	04	70	**	73	31	25.0%
		٥	Cecal (Dairy)												13.0%
			Retail Pork Chops	80.4%	78.0%	75.7%	86.3%	81.4%	90.1%	77.2%	83.8%	79.0%	79.3%	81.7%	7 82.3%
	1	1		205	244	237	276	245	237	203	217	279	265	286	270
		/ine	Cecal (Market Hons)												72.7%
		Swine	Cecal (Market Hogs)  Cecal (Sows)												72.7% 40 77.3%

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, chicken carcass rinsates were not sampled for *Enterococcus*<sup>2</sup> Not presented as *E. faecalis* is considered intrinsically resistant to Quinupristin-Dalfopristin

Table 97a. Resistance Patt Year			2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested	Chickens	Retail Chickens HACCP <sup>1</sup>	134	188 1285	88 1440	116 1839	126 1150	123 776	165 501	138 418	214 420	186 275	204	202
		Cecal												35
	Turkeys	Retail Ground Turkey Cecal	294	289	260	339	291	261	271	260	369	392	384	407 26
	Cattle	Retail Ground Beef Cecal (Beef) Cecal (Dairy)	210	224	194	226	227	206	202	227	285	269	277	304 36 54
	Swine	Retail Pork Chops Cecal (Market Hogs) Cecal (Sows)	255	313	313	320	301	263	263	259	353	334	350	328 55 66
Resistance Pattern <sup>2</sup>		Source												
1. No Resistance Detected	2	Retail Chickens	0.8% 1	0.5% 1	0.0% 0	0.9% 1	0.0%	0.0% 0	0.0%	0.7% 1	0.5% 1	0.5% 1	1.0%	0.0%
	Chickens	HACCP		0.1%	0.3% 5	0.1%	0.0%	0.0%	0.2%	1.0%	0.5%	0.0%		
	0	Cecal												0.0%
	eys	Retail Ground Turkey	1.4% 4	1.0%	0.4% 1	0.6% 2	0.3%	0.0% 0	0.0%	1.5% 4	2.2% 8	0.8%	0.5% 2	0.3% 1
	Turkeys	Cecal												0.0%
		Retail Ground Beef	0.0%	2.7%	1.5%	1.3%	1.8%	2.0%	0.5%	1.8%	0.7% 2	2.2%	1.1%	3.3% 10
	Cattle	Cecal (Beef)	Ů		3	3		7		7	2	Ü	3	0.0%
		Cecal (Dairy)												1.9%
	$\vdash$	Retail Pork Chops	0.4%	0.0%	0.6%	1.3%	0.0%	0.4%	0.4%	0.4%	0.3%	0.6%	0.9%	0.0%
	Swine	Cecal (Market Hogs)	1	0	2	4	0	1	1	1	1	2	3	0.0%
	Ś	Cecal (Sows)												0.0%
2. Resistance to ≥ 3		Retail Chickens	52.2%	47.9%	42.1%	50.0%	43.7%	45.5%	40.6%	43.5%	39.7%	41.4%	37.3%	0 38.1%
Antimicrobial Classes	ens		70	90 50.8%	37 52.3%	58 51.2%	55 58.7%	56 51.4%	67 57.9%	60 52.9%	85 54.8%	77 59.3%	76	77
	Chickens	HACCP		653	753	941	675	399	290	221	230	163		45.7%
		Cecal	49.3%	54.3%	52.7%	43.4%	56.7%	67.0%	69.7%	50.0%	58.5%	60.2%	53.7%	16 58.0%
	Turkeys	Retail Ground Turkey	145	157	137	147	165	175	189	130	216	236	206	236
	F	Cecal	4.00/	0.707	10.00/	10.00/		0.004		0.00/	0.504	0.70	4.00/	15
	0	Retail Ground Beef	4.8% 10	6.7% 15	10.8% 21	10.2% 23	7.5% 17	6.8% 14	5.5% 11	6.6% 15	2.5% 7	3.7% 10	1.8% 5	3.6% 11
	Cattle	Cecal (Beef)												13.9% 5
		Cecal (Dairy)												5.6% 3
		Retail Pork Chops	15.7% 40	9.9% 31	18.8% 59	14.4% 46	12.3% 37	16.3% 43	17.5% 46	14.7% 38	9.3% 33	8.4% 28	8.6% 30	8.2% 27
	Swine	Cecal (Market Hogs)												56.4% 31
		Cecal (Sows)												59.1% 39
3. Resistant to ≥ 4 Antimicrobial Classes		Retail Chickens	32.1% 43	19.1% 36	18.2% 16	20.7% 24	19.8% 25	22.8% 28	21.2% 35	21.7% 30	23.8% 51	23.1% 43	21.1% 43	19.3% 39
Anumiciobiai Classes	Chickens	HACCP	43	22.5%	22.9%	23.1%	28.4%	22.9%	29.5%	23.4%	27.1%	27.6%	43	39
	ş	Cecal		289	330	424	327	178	148	98	114	76		28.6%
	s	Retail Ground Turkey	17.7%	31.1%	22.3%	25.7%	22.7%	36.4%	42.8%	28.1%	29.5%	30.9%	23.7%	10 26.5%
	Turkeys	Cecal	52	90	58	87	66	95	116	73	109	121	91	108 26.9%
	Ë	Retail Ground Beef	1.9%	3.1%	3.1%	4.4%	2.2%	1.5%	2.0%	1.3%	0.7%	1.5%	0.0%	7 2.6%
	Cattle	Cecal (Beef)	4	7	6	10	5	3	4	3	2	4	0	5.6%
	ő	Cecal (Dairy)												1.9%
	_	Retail Pork Chops	4.7%	5.1%	5.8%	4.4%	3.3%	2.3%	4.9%	3.9%	2.5%	3.3%	3.1%	1 4.3%
	e u		12	16	18	14	10	6	13	10	9	11	11	14 30.9%
	Swin	Cecal (Market Hogs)												17 43.9%
4. Resistant to ≥ 5		Cecal (Sows)	0.0%	0.5%	1.1%	0.9%	0.0%	0.0%	1.2%	1.4%	0.9%	0.0%	0.0%	29
Antimicrobial Classes	3US	Retail Chickens	0.0%	0.5%	1 0.8%	0.5%	0.0%	0.0%	2 0.6%	2 0.2%	0.9%	0.0%	0.0%	1
	Chickens	HACCP		0.0%	11	9	1.0%	7	3	1	1	9		0.004
	<u> </u>	Cecal	2						e =:					0.0%
	Turkeys	Retail Ground Turkey	0.7% 2	0.7% 2	0.0%	1.5% 5	0.3% 1	0.0%	0.7% 2	0.0%	0.0%	0.8% 3	0.0%	0.3% 1
	Ţ	Cecal												0.0%
		Retail Ground Beef	0.0% 0	0.0% 0	0.0% 0	0.4% 1	0.4% 1	0.5% 1	0.0%	0.0%	0.0% 0	0.7% 2	0.0% 0	0.3% 1
	Cattle	Cecal (Beef)												2.8% 1
		Cecal (Dairy)												0.0%
		Retail Pork Chops	0.4%	0.6%	1.0%	1.3%	0.7%	0.4% 1	0.8%	0.8%	0.0%	0.6%	0.9%	1.2%
	Swine	Cecal (Market Hogs)												12.7%
	S	Cecal (Sows)												18.2% 12
	٠.	ates were not sampled												12

In 2012 and 2013, chicken carcass rinsates were not sampled for *Enterococcus* Resistance patterns do not include Quinupristin-Dalfoprisitn as *E. faecalis* is considered intrinsically resistant

Table 97b. Resistance Patterns among Enterococcus faecalis Isolates, 2002-2013 Number of Isolates Tested Retail Chickens 214 HACCE 1285 1///0 1830 1150 776 501 118 420 2 Cecal 35 Retail Ground Turkey 294 289 260 339 291 261 271 260 369 392 384 407 Cecal 26 Retail Ground Beef 210 224 194 226 227 206 202 227 285 269 277 304 Cattle Cecal (Beef) 54 Cecal (Dairy) Retail Pork Chops 255 313 313 320 301 263 263 259 353 334 328 Cecal (Market Hogs) 55 Cecal (Sows) Resistance Pattern 0.0% Retail Chickens Antimicrobial Classes Chickens 0.0% 0.1% 0.1% 0.0% 0.2% 0.0% 0.7% HACCP 0.0% Cecal 0.3% 0.0% 0.0% 1.2% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Ground Turkey 0.0% Cecal 0.0% Retail Ground Beef 0.0% 0.0% 0.0% 0.0% 0.4% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0 Cattle Cecal (Beef) 0 0.0% Cecal (Dairy) 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Pork Chops 0.0% Cecal (Market Hogs) 0 0.0% Cecal (Sows) 6 At Least Pencillin G 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Chickens High Level Gentamicin 0.0% 0.0% and Daptomycin Resistant 0.0% 0.0% 0.0% 0.0% 0.0% HACCP Cecal 0.0% 0 0.0% 0.0% 0.0% 0.0% Retail Ground Turkey 0 0.0% Cecal Retail Ground Beef 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Cecal (Beef) 0 Cecal (Dairy) 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Pork Chops 0.0% Cecal (Market Hogs) 0 0.0% Cecal (Sows) 0 7. At Least Pencillin G 0.0% 0.0% 0.0% 0.09 0.0% Retail Chickens 0.0% High Level Gentamicin and Linezolid Resistant 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% HACCP 0.0% Cecal 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Ground Turkey 0.0% 0.0% 0.0% 0 0.0% Cecal 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Ground Beef 0.0% Cecal (Beef) Cecal (Dairy) 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Pork Chops

<sup>1</sup> In 2012 and 2013, chicken carcass rinsates were not sampled for *Enterococcus* 

Cecal (Market Hogs)

Retail Ground Turkey

Retail Ground Beef

Retail Pork Chops

Cecal (Market Hogs)

Cecal (Beef)
Cecal (Dairy)

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

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0.0%

0.0%

0.0%

0.0%

Cecal (Sows)

Retail Chickens

HACCP

Cecal

Cecal

Chickens

High Level Gentamicin

and Tigecycline Resistant

0.0%

0.0%

0.0%

0.0%

0.0%

0

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

<sup>&</sup>lt;sup>2</sup> Resistance patterns do not include Quinupristin-Dalfoprisitn as *E. faecalis* is considered intrinsically resistant

## Antimicrobial Susceptibility among Enterococcus faecium

### **MIC Distributions**

Table 98a, Distribution of MICs and Occurrence among Enterococcus faecium Isolates, 2012

Table 98a. Distrib	ution of MICs and O	ccu	rrence among Entero Isolate Source	cocci	is tae	cium Isolat	es, 2012																	
Antimicrobial Class	Antimicrobial Agent		(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.02 0.03	0.06	0.125	0.25	0.50	1	Distrii 2	bution 4	(%) of 8	MICs (	'ua/m1)' 32	64	128	256	512	1024	2048	>2048
Aminoglycosides	Gentamicin	Chickens	Retail Chickens (235)	N/A		[3.9 - 10.8]													93.2		0.4	0.9	5.5	
		Turkeys	Retail Ground Turkey (73)	N/A	13.7	[6.8 - 23.8]													86.3			4.1	9.6	
		Cattle	Retail Ground Beef (91)	N/A	0.0	[0.0 - 4.0]													100.0					
		Swine	Retail Pork Chops (52)	N/A	0.0	[0.0 - 6.8]													100.0					
	Kanamycin	Chickens	Retail Chickens (235)	N/A	8.1	[4.9 - 12.3]													73.2	12.8	6.0	1.7	6.4	
		Turkeys	Retail Ground Turkey (73)	N/A	26.0	[16.5 - 37.6]													43.8	24.7	5.5		26.0	
		Cattle	Retail Ground Beef (91)	N/A	5.5	[1.8 - 12.4]													64.8	25.3	4.4	2.2	3.3	
		Swine	Retail Pork Chops (52)	N/A	0.0	[0.0 - 6.8]													86.5	11.5	1.9			
	Streptomycin	Chickens	Retail Chickens (235)	N/A	17.9	[13.2 - 23.4]															82.1	8.5	6.8	2.6
		e Turkeys	Retail Ground Turkey (73)	N/A	47.9	[36.1 - 60.0]															52.1	15.1	19.2	13.7
		e Cattle	Retail Ground Beef (91)	N/A	3.3	[0.7 - 9.3]															96.7		3.3	
		Swine	Retail Pork Chops (52)	N/A	0.0	[0.0 - 6.8]											11				100.0			
Glycopeptides	Vancomycin	S Chickens	Retail Chickens (235)	0.0	0.0	[0.0 - 1.6]					63.8	23.0	13.2											
		e Turkeys	Retail Ground Turkey (73)	0.0	0.0	[0.0 - 4.9]					50.7	27.4	20.5	1.4										
		ne Cattle	Retail Ground Beef (91)	0.0	0.0	[0.0 - 4.0]				2.2	82.4	7.7	7.7											
		Swine	Retail Pork Chops (52)	0.0	0.0	[0.0 - 6.8]				3.9	86.5	7.7	1.9											
	Tigecycline	Chickens	Retail Chickens (235)	N/A	0.0	[0.0 - 1.6]	4.7	43.8	41.3	10.2														
		Turkeys	Retail Ground Turkey (73)	N/A	0.0	[0.0 - 4.9]	1.4	47.9	45.2	5.5														
		Cattle	Retail Ground Beef (91)	N/A	0.0	[0.0 - 4.0]	2.2	63.7	22.0	12.1														
		Swine	Retail Pork Chops (52)	N/A	0.0	[0.0 - 6.8]	3.9	57.7	26.9	11.5														
Lincosamides	Lincomycin	Chickens	Retail Chickens (235)	0.0	78.7	[72.9 - 83.8]						20.9	0.4		1.7	77.0								
		Turkeys	Retail Ground Turkey (73)	2.7	83.6	[73.0 - 91.2]						12.3	1.4	2.7	2.7	80.8								
		Cattle	Retail Ground Beef (91)	1.1	72.5	[62.2 - 81.4]						23.1	3.3	1.1	14.3	58.2								
4		Swine	Retail Pork Chops (52)			[79.0 - 96.8]						9.6			36.5	53.9								

Percent of isolates with intermediate susceptibility. NA used when there is no intermediate breakpoint established.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

35% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the dilution range of the Sensititre plates used to test isolates. Single vertical lines indicate the breakpoints for susceptibility, while double vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

Table 98b. Distribution of MICs and Occurrence among Enterococcus faecium Isolates, 2012

		Ī	urrence among Entero Isolate Source									Distri	bution	(%) of	MICs (	μg/ml)'	4					
Antimicrobial Class	Antimicrobial Agent	_	(# of Isolates)	%l <sup>1</sup>	%R²	[95% CI] <sup>3</sup>	0.02 0.03	0.06 0.125	0.25	0.50	1	2	4	` ´8	16	32	64	128	256	512	1024	2048 >204
Lipopeptides	Daptomycin <sup>5</sup>	Chickens	Retail Chickens (235)	N/A	N/A	N/A					4.7	10.2	79.6	5.5								
		Turkeys	Retail Ground Turkey (73)	N/A	N/A	N/A					1.4	13.7	63.0	20.5	1.4							
		e Cattle	Retail Ground Beef (91)	N/A	N/A	N/A					1.1	31.9	65.9	1.1								
		Swin	Retail Pork Chops (52)	N/A	N/A	N/A					1.9	46.2	50.0	1.9								
Macrolides	Erythromicin	Chickens	Retail Chickens (235)	51.9	21.3	[16.2 - 27.1]			14.5	13.3	15.7	29.8	6.4	0.4	20.9							
		Turkeys	Retail Ground Turkey (73)	45.2	27.4	[17.6 - 39.1]			20.6	6.8	21.9	11.0	12.3	4.1	23.3							
		Cattle	Retail Ground Beef (91)	80.3	3.3	[0.7 - 9.3]			15.4	1.1	20.9	29.7	29.7	1.1	2.2							
		Swine	Retail Pork Chops (52)	94.2	1.9	[0.0 - 10.3]				3.9	19.2	36.5	38.5		1.9							
	Tylosin	Chickens	Retail Chickens (235)	1.3	20.9	[15.8 - 26.6]					12.3	24.7	28.5	12.3	1.3		20.9					
		Turkeys	Retail Ground Turkey (73)	0.0	17.8	[9.8 - 28.5]				1.4	4.1	21.9	47.9	6.9			17.8					
		Cattle	Retail Ground Beef (91)	9.9	2.2	[0.3 - 7.7]					7.7	27.5	33.0	19.8	9.9		2.2					
		Swine	Retail Pork Chops (52)	3.9	0.0	[0.0 - 6.8]				1.9	3.9	11.5	44.2	34.6	3.9							
Nitrofurans	Nitrofurantoin	Chickens	Retail Chickens (235)	60.4	36.6	[30.4 - 43.1]									0.4	2.6	60.4	36.6				
		Turkeys	Retail Ground Turkey (73)	54.8	39.7	[28.5 - 51.9]								1.4		4.1	54.8	39.7				
		Cattle	Retail Ground Beef (91)	73.6	22.0	[14.0 - 31.9]								1.1		3.3	73.6	22.0				
		Swin	Retail Pork Chops (52)	86.5	5.8	[1.2 - 15.9]								1.9		5.8	86.5	5.8				
Oxazolidinones	Linezolid	Chickens	Retail Chickens (235)	0.4	0.0	[0.0 - 1.6]					37.5	62.1	0.4									
		Turkeys	Retail Ground Turkey (73)	0.0	0.0	[0.0 - 4.9]					45.2	54.8										
		Cattle	Retail Ground Beef (91)	1.1	0.0	[0.0 - 4.0]					16.5	82.4	1.1									
		Swine	Retail Pork Chops (52)	0.0	0.0	[0.0 - 6.8]					28.9	71.1										
Penicillins	Penicillin	Chickens	Retail Chickens (235)	N/A	11.9	[8.1 - 16.8]			2.1	3.4	2.1	28.1	44.3	8.1	6.8	5.1						
		Turkeys	Retail Ground Turkey (73)	N/A	68.5	[56.6 - 78.9]				1.4	6.8	4.1	17.8	1.4	17.8	50.7						
		Cattle	Retail Ground Beef (91)	N/A	3.3	[0.7 - 9.3]			18.7	3.3	5.5	12.1	45.1	12.1	3.3							
		Swine	Retail Pork Chops (52)	N/A	0.0	[0.0 - 6.8]			15.4	3.9	17.3	25.0	28.8	9.6								
										_	_											

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

Soundidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

The unshaded areas indicate the dilution range of the Sensitive plates used to test isolates. Single vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

<sup>&</sup>lt;sup>5</sup> There are no established CLSI breakpoints for daptomycin

Table 98c. Distribution of MICs and Occurrence among Enterococcus faecium Isolates, 2012

		ccurrence among Entero Isolate Source					_					Distri	oution	(%) of	MICs (	ua/ml\	4					
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.02	0.03	0.06 0.1	25 0.25	0.50	1	2		8	16	μg///// 32		128	256	512	1024	2048 >204
Phenicols	Chloramphenicol	SE SE SE SE SE SE SE SE SE SE SE SE SE S	0.9	0.0	[0.0 - 1.6]								28.5	70.6	0.9							
		양 보 Retail Ground Turkey (73)	0.0	1.4	[0.0 - 7.4]								41.1	57.5		1.4						
		Retail Ground Beef (91)	0.0	1.1	[0.0 - 6.0]								11.0	87.9		1.1						
		Retail Pork Chops (52)	0.0	0.0	[0.0 - 6.8]								34.6	65.4								
Quinolones	Ciprofloxacin	SE SE SE SE SE SE SE SE SE SE SE SE SE S	46.8	39.6	[33.3 - 46.1]				0.4	0.9	12.3	46.8	34.9	4.7								
		Retail Ground Turkey (73)	24.7	54.8	[42.7 - 66.5]					8.2	12.3	24.7	49.3	5.5								
		Retail Ground Beef (91)	26.4	12.1	[6.2 - 20.6]					16.5	45.0	26.4	12.1									
		Retail Pork Chops (52)	30.8	3.8	[0.5 - 13.2]				13.5	11.5	40.4	30.8	3.8									
Streptogramins	Quinupristin- Dalfopristin	SE SE SE SE SE SE SE SE SE SE SE SE SE S	39.1	37.4	[31.2 - 44.0]					20.9	2.6	39.1	8.5	17.5	4.3	7.2						
		양 일본 Retail Ground Turkey (73)	2.7	64.4	[52.3 - 75.3]						6.9	2.7	26.0	12.3	17.8	23.3	11.0					
		Retail Ground Beef (91)	44.0	26.4	[17.7 - 36.7]					22.0	7.7	44.0	25.3	1.1								
		Retail Pork Chops (52)	67.3	23.1	[12.5 - 36.8]					3.8	5.8	67.3	21.2	1.9								
Tetracyclines	Tetracycline	Retail Chickens (235)	1.7	55.7	[49.1 - 62.2]						39.1	1.3	2.1	1.7	1.3		54.5					
		양 원 Retail Ground Turkey (73)	0.0	78.1	[66.9 - 86.9]						20.5		1.4				78.1					
		Retail Ground Beef (91)	0.0	23.1	[14.9 - 33.1]						76.9						23.1					
		Retail Pork Chops (52)	0.0	30.8	[18.7 - 45.1]						69.2						30.8					

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

<sup>&</sup>lt;sup>3</sup> 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

<sup>&</sup>lt;sup>4</sup>The urshaded areas indicate the dilution range of the Sensititre plates used to test isolates. Single vertical lines indicate the breakpoints for susceptibility, while double vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

Table 99a. Distribution of MICs and Occurrence among Enterococcus faecium Isolates, 2013

Antimicrobial Class	Antimicrobial Agent	Isolate Source (# of Isolates)	%l <sup>1</sup>	%R²	[95% CII <sup>3</sup>	0.02 0.03	0.06	0.125	0.25	0.50	1	Distril 2	oution (	(%) of I 8	MICs (u 16	a/mI)⁴ 32	64 12	8 2	<u>56</u> 5	12	1024	2048	<u>&gt;2</u> 048
Aminoglycosides	Gentamicin	- 2	N/A	7.0	[4.0 - 11.3]												93				0.9	6.1	
		Retail Chickens (213)	N/A	0.0	[0.0 - 45.9]													3 16	6.7				
			N/A	8.3	[2.3 - 20.0]												89	6 2	.1			8.3	
		Retail Ground Turkey (48)  Cecal (4)	N/A	0.0	[0.0 - 60.2]												100						
		Retail Ground Beef (80)	N/A	0.0	[0.0 - 4.5]												100	0					
		Cecal (Beef) (27)	N/A	0.0	[0.0 - 12.8]												100						
		Cecal (Dairy) (34)	N/A	0.0	[0.0 - 10.3]												100						
		Retail Pork Chops (50)	N/A	0.0	[0.0 - 7.1]												100	.0					
		Cecal (Market Hogs) (12)	N/A	0.0	[0.0 - 26.5]												100						
		Cecal (Sows) (7)	N/A	0.0	[0.0 - 41.0]												100	.0					
	Kanamycin	Retail Chickens (213)	N/A	9.4	[5.8 - 14.1]												72	8 14	4.1 3	3.8	1.9	7.5	
		Retail Chickens (213) Cecal (6)	N/A	33.3	[4.3 - 77.7]												66	7				33.3	
		Retail Ground Turkey (48)  Cecal (4)	N/A	27.1	[15.3 - 41.8]												52	1 14	4.6 6.	3	2.1	25.0	
		Cecal (4)	N/A	0.0	[0.0 - 60.2]												100	.0					
		Retail Ground Beef (80)	N/A	3.8	[0.8 - 10.6]												67	5 22	2.5 6.	2		3.8	
		te Cecal (Beef) (27)	N/A	0.0	[0.0 - 12.8]												59	3 40	0.7				
		Cecal (Dairy) (34)	N/A	2.9	[0.1 - 15.3]												76	5 17	7.7 2.	9		2.9	
		Retail Pork Chops (50)	N/A	4.0	[0.5 - 13.7]												86		.0 2.	0		4.0	
		Cecal (Market Hogs) (12)	N/A	0.0	[0.0 - 26.5]													7 3	3.3				
	2	Cecal (Sows) (7)	N/A	28.6	[3.7 - 71.0]												71	4				28.6	
	Streptomycin	Retail Chickens (213) Cecal (6)	N/A	17.4	[12.5 - 23.1]																10.8	5.2	1.4
			N/A	0.0	[0.0 - 45.9]														10	0.00			
		Retail Ground Turkey (48)  Cecal (4)	N/A	37.5	[24.0 - 52.6]																14.6	16.7	6.2
			N/A	0.0	[0.0 - 60.2]															0.00			
		Retail Ground Beef (80)  Cecal (Beef) (27)	N/A	2.5	[0.3 - 8.7]															7.5		2.5	
		Tecal (Beef) (27) Cecal (Dairy) (34)	N/A N/A	0.0 2.9	[0.0 - 12.8] [0.1 - 15.3]															00.0 07.1	2.9		
		Retail Pork Chops (50)	N/A	4.0	[0.5 - 13.7]															6.0	2.5		4.0
		Cecal (Market Hogs) (12)	N/A	25.0	[5.5 - 57.2]															5.0		25.0	4.0
		Oceal (Sows) (7)	N/A	42.9	[9.9 - 81.6]																28.6		
Glycopeptides	Vancomycin		0.0	0.0	[0.0 - 1.7]					62.0	24.9	13.2			I								
		Retail Chickens (213)	0.0	0.0	[0.0 - 45.9]					33.3		66.7											
			0.0	0.0	ro o = 11					37.5	25.0	35.4	2.1										
		Retail Ground Turkey (48) Cecal (4)	0.0	0.0	[0.0 - 7.4] [0.0 - 60.2]					75.0	20.0	25.0											
		Retail Ground Beef (80)	0.0	0.0	[0.0 - 4.5]				2.5	87.5	7.5	2.5											
		© ## Cecal (Beef) (27)	0.0	0.0	[0.0 - 4.5]					66.7	7.4	25.9											
		Cecal (Dairy) (34)	0.0	0.0	[0.0 - 10.3]					52.9	17.7	29.4											
		Retail Pork Chops (50)	0.0	0.0	[0.0 - 7.1]				8.0	74.0	14.0	4.0											
		Cecal (Market Hogs) (12)	0.0	0.0	[0.0 - 26.5]					66.7	16.7	16.7											
		Cecal (Sows) (7)	0.0	0.0	[0.0 - 41.0]					85.7	14.3												
	Tigecycline	Retail Chickens (213)	N/A	0.0	[0.0 - 1.7]	8.9	48.8	35.2	7.0														
		Gecal (6)	N/A	0.0	[0.0 - 45.9]		33.3	66.7															
		Retail Ground Turkey (48)  Cecal (4)	N/A	0.0	[0.0 - 7.4]	6.2	41.7	35.4	16.7														
		E Cecal (4)	N/A	0.0	[0.0 - 60.2]		25.0	50.0	25.0														
		Retail Ground Beef (80)	N/A	0.0	[0.0 - 4.5]	20.0	50.0	20.0	10.0														
		Te Cecal (Beef) (27)	N/A	0.0	[0.0 - 12.8]	7.4		14.8															
		Cecal (Dairy) (34)	N/A	0.0	[0.0 - 10.3]	17.7		17.7															
		Retail Pork Chops (50)	N/A N/A	0.0	[0.0 - 7.1]	10.0		42.0	6.0														
		Cecal (Market Hogs) (12) Cecal (Sows) (7)	N/A	0.0	[0.0 - 26.5]			41.7 57.1	14 3														
Lincosamides	Lincomycin	٠,			[0.0 - 41.0]		20.0	37.1	14.5		40.0	0.0			00.0								
Lincosumides	2ooyo	Retail Chickens (213) Cecal (6)	0.0	83.1 100.0	[77.4 - 87.9] [54.1 - 100.0]						16.0	0.9		0.9	82.2 100.0								
			2.1	91.7	[80.0 - 97.7]						6.2	2.1	2.1		89.6								
		Retail Ground Turkey (48)	0.0	75.0	[19.4 - 99.4]						25.0	۷.۱	۷.۱		75.0								
		Cecal (4)  Retail Ground Beef (80)	1.3								33.7	6.2	1.3	8.8	50.0								
		Cecal (Beef) (27)	0.0	58.8 81.5	[47.2 - 69.6]						18.5	J.Z	1.3	7.4	74.1								
		Cecal (Dairy) (34)	0.0	67.6	[61.9 - 93.7]						32.3			11.8	55.9								
		Retail Pork Chops (50)	2.0	84.0	[49.5 - 82.6] [70.9 - 92.8]						14.0		2.0	40.0	44.0								
		Cecal (Market Hogs) (12)	0.0	83.3	[70.9 - 92.8] [51.6 - 97.9]						8.3	8.3		16.7									
		ທ໌ Cecal (Sows) (7)	0.0	85.7	[42.1 - 99.6]						14.3				85.7								
Percent of isolates with intern	nediate susceptibility. N/A used	when there is no intermediate breakpoint	establishe	ed.																			

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

35% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

The unshaded areas indicate the dilution range of the Sensitire plates used to rest isolates. Single vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

Table 99b. Distribu	Ition of MICs and Oc	ccui	rrence among Enteroc Isolate Source	occus	s taeci	um Isolates	, 2013					Distril	oution	(%) of	MICs (	μg/ml)	4					
Antimicrobial Class	Antimicrobial Agent		(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	0.02 0.03	0.06 0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024	2048 >204
Lipopeptides	Daptomycin <sup>5</sup>	Chicken	Retail Chickens (213)	N/A	N/A	N/A					2.4	5.6	86.4	5.6								
			Cecal (6)	N/A	N/A	N/A						50.0	50.0									
		Turkeys	Retail Ground Turkey (48)	N/A	N/A	N/A				2.1	6.2	16.7	56.3	12.5	6.2							
		Tur	Cecal (4)	N/A	N/A	N/A							75.0	25.0								
		е	Retail Ground Beef (80)	N/A	N/A	N/A					6.3	18.7	75.0									
		Cattle	Cecal (Beef) (27)	N/A	N/A	N/A						3.7	92.6	3.7								
			Cecal (Dairy) (34)	N/A	N/A	N/A				2.9	8.8		82.4	5.9								
		e	Retail Pork Chops (50)	N/A	N/A	N/A						20.0	80.0									
		Swine	Cecal (Market Hogs) (12)	N/A	N/A	N/A						8.3	91.7									
		e	Cecal (Sows) (7)	N/A	N/A	N/A						28.6										
Macrolides	Erythromicin	Chicken	Retail Chickens (213)	54.0	29.6	[23.5 - 36.2]			8.4	8.0	20.7		8.0	1.4	28.2							
			Cecal (6)	66.7	16.7	[0.4 - 64.1]			16.7		16.7		16.7		16.7							
		Turkeys	Retail Ground Turkey (48)	35.4	39.6	[25.8 - 54.7]				2.1	10.4	20.8	4.2	10.4	29.2							
		ľ	Cecal (4)	50.0	0.0	[0.0 - 60.2]			50.0			25.0	25.0									
		<u>e</u>	Retail Ground Beef (80)	72.4	7.5	[2.8 - 15.6]			17.5	2.5	26.2	21.2	25.0	1.3	6.3							
		Catt	Cecal (Beef) (27)	66.6	3.7	[0.1 - 19.0]			29.6			25.9	18.5	3.7								
			Cecal (Dairy) (34)	76.4	0.0	[0.0 - 10.3]			14.7	8.8		38.2	14.7									
		ne	Retail Pork Chops (50)	90.0	4.0	[0.5 - 13.7]			4.0	2.0	16.0		46.0		4.0							
		Swine	Cecal (Market Hogs) (12)	41.7	16.7	[2.1 - 48.4]			25.0			25.0	16.7	8.3	8.3							
	<b></b> .	ű	Cecal (Sows) (7)	42.9	14.3	[0.4 - 57.9]			28.6	14.3	44.5	42.9	24.0	40.0	14.3	11						
	Tylosin	Chicken	Retail Chickens (213)	0.0	27.7	[21.8 - 34.2]					14.5	16.0	31.0 50.0				27.7					
			Cecal (6)	0.0	16.7	[0.4 - 64.1]											16.7					
		Turkeys	Retail Ground Turkey (48)	0.0	20.8	[10.5 - 35.0]					8.3	16.7		12.5			20.8					
		ľ	Cecal (4)	0.0	0.0	[0.0 - 60.2]						25.0	75.0									
		e	Retail Ground Beef (80)	0.0	5.0	[1.4 - 12.3]						31.2					5.0					
		Cattle	Cecal (Beef) (27)	0.0	0.0	[0.0 - 12.8]					3.7	22.2		51.9								
			Cecal (Dairy) (34)	0.0	0.0	[0.0 - 10.3]					8.8			23.5	4.0	4.0						
		Swine	Retail Pork Chops (50) Cecal (Market Hogs) (12)	4.0	4.0 8.3	[0.5 - 13.7] [0.2 - 38.5]					6.0	25.0	54.0 33.3	16.0 33.3	4.0	4.0	8.3					
		Sw	Cecal (Sows) (7)	0.0	14.3	[0.4 - 57.9]					28.6	28.6					14.3					
Nite of constant	Nitrationalis	kens	Retail Chickens (213)	73.7	23.0	[17.5 - 29.2]					20.0	20.0	14.0	14.0	0.5	2.8		23.0				
Nitrofurans	Nitrofurantoin	Chick	Cecal (6)	50.0	0.0	[0.0 - 45.9]									0.0	2.0						
				58.3	29.2	[17.0 - 44.1]										12.5		29.2				
		Furkeys	Retail Ground Turkey (48)	50.0	25.0	[0.6 - 80.6]								25.0		12.0	50.0	25.0				
		_	Cecal (4)  Retail Ground Beef (80)		20.0	[11.9 - 30.4]								20.0		5.0						
		Cattle	Cecal (Beef) (27)	75.0 77.8	0.0	[0.0 - 12.8]										11.1	75.0 77.8	20.0				
		రొ	Cecal (Dairy) (34)	70.6	0.0	[0.0 - 10.3]									5.9		70.6	23.5				
			Retail Pork Chops (50)	76.0	16.0	[7.2 - 29.1]									0.0	8.0	76.0	16.0				
		vine	Cecal (Market Hogs) (12)	91.7	0.0	[0.0 - 26.5]										8.3	91.7					
		Ó	Cecal (Sows) (7)	71.4	0.0	[0.0 - 41.0]												28.6				
Oxazolidinones	Linezolid	kens	Retail Chickens (213)	0.0	0.0	[0.0 - 1.7]				1.4	45.5	53.1										
		Chick	Cecal (6)	0.0	0.0	[0.0 - 45.9]					50.0	50.0										
		_	Retail Ground Turkey (48)	0.0	0.0	[0.0 - 7.4]					37.5	62.5										
		Turkeys	Cecal (4)	0.0	0.0	[0.0 - 60.2]						50.0										
		F	Retail Ground Beef (80)	0.0	0.0	[0.0 - 4.5]				1.3	25.0											
		Cattle	Cecal (Beef) (27)	0.0	0.0	[0.0 - 12.8]						77.8										
		Ö	Cecal (Dairy) (34)	0.0	0.0	[0.0 - 10.3]						79.4										
			Retail Pork Chops (50)	0.0	0.0	[0.0 - 7.1]						70.0										
		Swine	Cecal (Market Hogs) (12)	0.0	0.0	[0.0 - 26.5]						66.7										
		S	Cecal (Sows) (7)	0.0	0.0	[0.0 - 41.0]					28.6	71.4										
Penicillins	Penicillin	ckens	Retail Chickens (213)	N/A	9.9	[6.2 - 14.7]			2.8	1.9	2.8	19.3	51.6	11.7	5.6	4.2						
		Chic	Cecal (6)	N/A	0.0	[0.0 - 45.9]						16.7	50.0	33.3								
			Retail Ground Turkey (48)	N/A	54.2	[39.2 - 68.6]			2.1	4.2	4.2	2.1	29.2	4.2	12.4	41.7						
		Turkeys	Cecal (4)	N/A	0.0	[0.0 - 60.2]					25.0		75.0									
			Retail Ground Beef (80)	N/A	5.0	[1.4 - 12.3]			22.5	10.0	1.2	10.0	45.0	6.3	3.8	1.2						
		Cattle	Cecal (Beef) (27)	N/A	0.0	[0.0 - 12.8]			7.4				77.8									
		O	Cecal (Dairy) (34)	N/A	0.0	[0.0 - 10.3]			5.9		5.9	11.8										
		_	Retail Pork Chops (50)	N/A	4.0	[0.5 - 13.7]			30.0	2.0	14.0	18.0	26.0	6.0	4.0							
		wine	Cecal (Market Hogs) (12)	N/A	0.0	[0.0 - 26.5]						8.3	75.0	16.7								
		S	Cecal (Sows) (7)	N/A	42.9	[9.9 - 81.6]			L				42.9	14.3	42.9							
			there is no intermediate breakpoint	and the Park											_		_					

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

395% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

The unshaded areas indicate the dilution range of the Sensitire plates used to test solates. Single vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

<sup>&</sup>lt;sup>5</sup> There are no established CLSI breakpoints for daptomycin

Table 99c, Distribution of MICs and Occurrence among Enterococcus faecium Isolates, 2013

			Isolate Source	1	-	-									µg/ml)'						
Antimicrobial Class	Antimicrobial Agent	ű	(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	195% CII <sup>3</sup>	0.02 0.03 0	0.06 0.125 0.25	0.50		2	4	8	16	32	64 12	28 25	6 51	2 1024	2048 >2	2048
Phenicols	Chloramphenicol	Chicken	Retail Chickens (213)	0.9	0.0	[0.0 - 1.7]						36.2		0.9							
			Cecal (6)	16.7	0.0	[0.0 - 45.9]						66.7	16.7	16.7							
		Turkeys	Retail Ground Turkey (48)	0.0	0.0	[0.0 - 7.4]						54.2	45.8								
		Tur	Cecal (4)	0.0	0.0	[0.0 - 60.2]						75.0	25.0								
			Retail Ground Beef (80)	0.0	1.3	[0.0 - 6.8]						38.8	60.0		1.2						
		Cattle	Cecal (Beef) (27)	0.0	0.0	[0.0 - 12.8]						37.0	63.0								
		0	Cecal (Dairy) (34)	0.0	0.0	[0.0 - 10.3]						47.1	52.9								
			Retail Pork Chops (50)	0.0	0.0	[0.0 - 7.1]						38.0	62.0								
		Swine	Cecal (Market Hogs) (12)	0.0	0.0	[0.0 - 26.5]						58.3	41.7								
		S	Cecal (Sows) (7)	0.0	0.0	[0.0 - 41.0]						71.4	28.6								
Quinolones	Ciprofloxacin	cens	Retail Chickens (213)	49.8	39.0	[32.4 - 45.9]		0.5	0.5	10.3	49.8	33.8	5.2								
		Chicken	Cecal (6)	0.0	50.0	[11.8 - 88.2]				50.0		16.7	33.3								
			Retail Ground Turkey (48)	37.5	35.4	[22.2 - 50.5]			8.3	18.7	37.5	29.2	6.3								
		Turkeys	Cecal (4)	0.0	50.0	[6.8 - 93.2]				50.0		50.0									
		_	Retail Ground Beef (80)	22.5	25.0	[16.0 - 35.9]			5.0	47.5	22.5	23.8	1.2								
		Cattle	Cecal (Beef) (27)	37.0	33.3	[16.5 - 54.0]			0.0	29.6	37.0	25.9	7.4								
		පී	Cecal (Dairy) (34)	38.2	50.0	[32.4 - 67.6]			2.9	8.8	38.2	38.2	11.8								
			Retail Pork Chops (50)	22.0	16.0	[7.2 - 29.1]		2.0	8.0	52.0	22.0	14.0	2.0								
		Swine	Cecal (Market Hogs) (12)	16.7	25.0	[5.5 - 57.2]		2.0	8.3	50.0	16.7	16.7	8.3								
		Š	Cecal (Sows) (7)	28.6	0.0	[0.0 - 41.0]			0.0	71.4	28.6	10.7	0.0								
Streptogramins	Quinupristin-	eus	Retail Chickens (213)	43.2	28.2	[22.2 - 34.7]			25.8		43.2	5.2	13.2	4.2	5.6						
Streptogramms	Dalfopristin	Chicker	Cecal (6)	66.7	33.3	[4.3 - 77.7]			20.0	2.0	66.7	3.2	33.3	4.2	3.0						
		_																			
		Turkeys	Retail Ground Turkey (48)	52.1	41.7	[27.6 - 56.8]			2.1	4.2	52.1	4.2	12.4	8.3	16.7						
		Ţ	Cecal (4)	75.0	0.0	[0.0 - 60.2]			25.0		75.0										
		<u>e</u>	Retail Ground Beef (80)	41.3	18.8	[10.9 - 29.0]			35.0	5.0	41.3	15.0	2.5		1.2						
		Cattle	Cecal (Beef) (27)	51.9	29.6	[13.8 - 50.2]			14.8	3.7	51.9	29.6									
			Cecal (Dairy) (34)	52.9	8.8	[1.9 - 23.7]			32.4	5.9	52.9	8.8									
		e.	Retail Pork Chops (50)	72.0	8.0	[2.2 - 19.2]			14.0	6.0	72.0	8.0									
		Swine	Cecal (Market Hogs) (12)	58.3	25.0	[5.5 - 57.2]			8.3	8.3	58.3	16.7	8.3								
		٤	Cecal (Sows) (7)	42.9	28.6	[3.7 - 71.0]			14.3	14.3	42.9	28.6									
Tetracyclines	Tetracycline	Chicken	Retail Chickens (213)	0.9	58.7	[51.8 - 65.4]				39.9		0.5	0.9	2.4	0.9	55.4					
			Cecal (6)	0.0	66.7	[22.3 - 95.7]				33.3						66.7					
		Turkeys	Retail Ground Turkey (48)	2.1	75.0	[60.4 - 86.4]				22.9			2.1			75.0					
		Turl	Cecal (4)	0.0	25.0	[0.6 - 80.6]				75.0						25.0					
		<b>A</b>	Retail Ground Beef (80)	0.0	20.0	[11.9 - 30.4]				80.0				2.5	1.2	16.3					
		Cattle	Cecal (Beef) (27)	0.0	29.6	[13.8 - 50.2]				70.4				3.7	3.7	22.2					
			Cecal (Dairy) (34)	0.0	11.8	[3.3 - 27.5]				88.2						11.8					
		ın.	Retail Pork Chops (50)	0.0	64.0	[49.2 - 77.1]				36.0					4.0	60.0					
		wine	Cecal (Market Hogs) (12)	0.0	41.7	[15.2 - 72.3]				58.3						41.7					
		0)	Cecal (Sows) (7)	0.0	71.4	[29.0 - 96.3]				28.6				l		71.4					

ate susceptibility. N/A used when there is no intermediate breakpoint established

<sup>&</sup>lt;sup>2</sup> Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

<sup>&</sup>lt;sup>4</sup> The unshaded areas indicate the dilution range of the Sensitire plates used to concentrations represent the present on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

Table 100a. Antimicrob	nur resistance aillo	ng i		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		kens	Retail Chickens	231	248	348	307	315	189	163	202	197	221	235	213
		Chickens	HACCP <sup>1</sup> Cecal		377	564	670	477	349	191	185	285	128		6
		Turkeys	Retail Ground Turkey	89	118	172	107	139	65	70	66	45	40	73	48
		Ţ	Cecal												4
		Cattle	Retail Ground Beef Cecal (Beef)	93	112	162	129	125	69	73	59	61	82	91	80 27
		_	Cecal (Dairy)												34
		Swine	Retail Pork Chops Cecal (Market Hogs)	93	97	75	75	70	33	35	26	32	37	52	50 12
	Antimicrobial	(i)	Cecal (Sows)												7
Antimicrobial Class	(Resistance Breakpoint)		Isolate Source												
Aminoglycosides	Gentamicin (MIC >500 μg/ml)	-	Retail Chickens	3.0% 7	5.6% 14	4.3% 15	6.2% 19	6.0% 19	9.5% 18	11.7% 19	6.9% 14	6.1% 12	9.5% 21	6.8% 16	7.0% 15
	(MIC >300 µg/III)	Chickens	HACCP	,	14.9%	12.1%	13.4%	11.9%	13.5% 47	15.7% 30	16.8%	14.7% 42	14.1%	10	15
		ပ်	Cecal		36	00	90	57	47	30	31	42	10		0.0%
		ys	Retail Ground Turkey	15.7%	12.7%	13.4%	12.1%	15.1%	1.5%	10.0%	18.2%	6.7%	10.0%	13.7%	8.3%
		Turkeys	Cecal	14	15	23	12	21	1	7	12	3	4	10	0.0%
			Retail Ground Beef	1.1%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	1.7%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)	1	0	0	1	0	0	0	1	0	0	0	0.0%
		ပိ	Cecal (Dairy)												0.0%
			Retail Pork Chops	1.1%	0.0%	0.0%	0.0%	1.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Swine	Cecal (Market Hogs)	1	0	0	0	1	0	0	0	0	0	0	0.0%
		δ													0.0%
	Kanamycin	-	Cecal (Sows)	6.5%	10.5%	9.5%	10.7%	6.3%	12.2%	11.7%	9.9%	5.6%	9.5%	8.0%	0 9.4%
	(MIC ≥ 1024 μg/ml)	sue	Retail Chickens	15	26 19.1%	33 15.1%	33 18.5%	20 15.7%	23 15.2%	19 26.7%	20 15.7%	11 15.8%	21 21.1%	19	20
		Chickens	HACCP		72	85	124	75	53	51	29	45	27		33.3%
			Cecal	39.3%	28.0%	35.5%	29.9%	33.8%	7.7%	12.9%	33.3%	15.6%	25.0%	26.0%	27.1%
		Turkeys	Retail Ground Turkey	35.376	33	61	32	47	5	9	22	7	10	19	13
		ī	Cecal												0
			Retail Ground Beef	4.3% 4	8.0% 9	8.6% 14	3.9% 5	1.6% 2	0.0%	5.5% 4	6.8%	8.2% 5	6.1% 5	5.5% 5	3.8%
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)												2.9% 1
			Retail Pork Chops	3.2%	2.1%	2.7% 2	8.0% 6	2.9%	3.0% 1	5.7% 2	0.0%	3.1% 1	5.4% 2	0.0%	4.0% 2
		Swine	Cecal (Market Hogs)												0.0% 0
			Cecal (Sows)												28.6% 2
	Streptomycin (MIC ≥ 1000 µg/ml)	sus	Retail Chickens	16.9% 39	16.9% 42	8.3% 29	14.0% 43	3.8% 12	3.7% 7	6.7% 11	30.2% 61	26.4% 52	27.2% 60	17.9% 42	17.4% 37
		Chicker	HACCP		14.6% 55	17.6% 99	23.3% 156	11.5% 55	9.2% 32	15.2% 29	21.6% 40	26.0% 74	23.4% 30		
		O	Cecal												0.0%
		eys	Retail Ground Turkey	39.3% 35	32.2% 38	34.3% 59	34.6% 37	22.3% 31	16.9% 11	17.1% 12	51.5% 34	29.9% 13	55.0% 22	48.0% 35	37.5% 18
		Turkeys	Cecal							-					0.0%
			Retail Ground Beef	3.2%	2.7%	5.6%	1.6%	0.8%	0.0%	2.7%	8.5% 5	3.3%	6.1%	3.3%	2.5%
		Cattle	Cecal (Beef)	3	3	9			U		5		5	3	0.0%
		0	Cecal (Dairy)												2.9%
			Retail Pork Chops	5.4%	3.1%	6.7%	6.7%	2.9%	0.0%	0.0%	3.8%	3.1%	5.4%	0.0%	4.0%
		Swine	Cecal (Market Hogs)	5	3	5	5	2	0	0	1	1	2	0	2 25.0%
		Ś	Cecal (Sows)												3 42.9%
Glycopeptides	Vancomycin		Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	(MIC ≥ 32 μg/ml)	Chickens	HACCP	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0
		Shio	Cecal		0	0	0	0	0	0	0	0	0		0.0%
		-		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0
		Turkeys	Retail Ground Turkey	0	0	0	0	0	0	0	0	0	0	0	0.0%
		É	Cecal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Ф	Retail Ground Beef	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)												0
		1	Cecal (Dairy)												0.0% 0
		-					4.611		A 2 2 2 2		4			4	
		ø	Retail Pork Chops	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Swine	Retail Pork Chops  Cecal (Market Hogs)												

Table 100b. Antimicro	biai Resistance an	nong i	Enterococcus faec	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested		suex	Retail Chickens	231	248	348	307	315	189	163	202	197	221	235	213
		Chickens	HACCP <sup>1</sup> Cecal	0	377	564	670	477	349	191	185	285	128		6
		Turkeys	Retail Ground Turkey	89	118	172	107	139	65	70	66	45	40	73	48
		TuT	Cecal												4
		Cattle	Retail Ground Beef Cecal (Beef)	93	112	162	129	125	69	73	59	61	82	91	80 27
		O	Cecal (Dairy)												34
		Swine	Retail Pork Chops	93	97	75	75	70	33	35	26	32	37	52	50
		Š	Cecal (Market Hogs) Cecal (Sows)												12 7
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class Glycylcycline	Breakpoint) Tigecycline		Source				0.0%	0.0%	0.0%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%
	(MIC ≥ 0.25 μg/ml) <sup>2</sup>	ens	Retail Chickens				0	0	0	3	0	0	0	0	0
		Chickens	HACCP					0.076	3	0.070	0.070	0.076	0.076		0.004
			Cecal												0.0%
		Turkeys	Retail Ground Turkey				0.0%	0.0%	0.0%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0% 0
		Tur	Cecal												0.0%
			Retail Ground Beef				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail Pork Chops				0.0%	0.0%	0.0%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%
		Swine	Cecal (Market Hogs)				U	U	U		U	0		U	0.0%
		Ò	Cecal (Sows)												0.0%
Lincosamides	Lincomycin		Retail Chickens	87.0%	86.7%	83.3%	78.2%	74.9%	84.1%	81.0%	83.2%	82.2%	81.9%	78.7%	0 83.1%
	(MIC ≥ 8 μg/ml)	Chickens	HACCP	201	215 93.6%	290 84.9%	240 87.2%	236 84.9%	159 86.0%	132 89.5%	168 89.2%	162 87.7%	181 93.0%	185	177
		Shio			353	479	584	405	300	171	165	250	119		100.0%
		_	Cecal	94.4%	89.0%	88.4%	92.5%	97.8%	92.3%	91.4%	93.9%	86.7%	87.5%	83.6%	6 91.7%
		Turkeys	Retail Ground Turkey	84	105	152	99	136	60	64	62	39	35	61	44 75.0%
		ĭ	Cecal												3
			Retail Ground Beef	76.3% 71	58.9% 66	67.9% 110	74.4% 96	41.6% 52	56.5% 39	75.3% 55	79.7% 47	73.8% 45	79.3% 65	72.5% 66	58.8% 47
		Cattle	Cecal (Beef)												81.5% 22
			Cecal (Dairy)												67.6% 23
			Retail Pork Chops	90.3% 84	89.7% 87	84.0% 63	88.0% 66	64.3% 45	66.7% 22	54.3% 19	84.6% 22	78.1% 25	73.0% 27	90.4% 47	84.0% 42
		Swine	Cecal (Market Hogs)												83.3% 10
		0,	Cecal (Sows)												85.7% 6
Lipopeptides	Daptomycin <sup>3</sup>		Retail Chickens			-	-	-	-	-	-	-	-	-	-
		ckens	HACCP			-	-	-	-	-	-	-	-		
		Chick	Cecal												-
		s	Retail Ground Turkey			_	_	-	_	_	_	_	-	_	<u> </u>
		Turkeys	Cecal												_
		F													Ė
		<u>a</u>	Retail Ground Beef			-	-	-	-	-	-	-	-	-	<u> </u>
		Cattle	Cecal (Beef)												-
			Cecal (Dairy)												-
		0	Retail Pork Chops			-	-	-	-	-	-	-	-	-	-
		Swine	Cecal (Market Hogs)												-
			Cecal (Sows)												-
Macrolides	Erythromycin (MIC ≥ 8 μg/ml)	ñ	Retail Chickens	25.5% 59	17.3% 43	12.6% 44	13.7% 42	9.5% 30	19.6% 37	22.1% 36	19.8% 40	13.7% 27	21.7% 48	21.3% 50	29.6% 63
	1	Chickens	HACCP		28.6% 108	23.6% 133	27.8% 186	29.4% 140	28.9%	28.8% 55	29.7% 55	21.4% 61	24.2% 31		
		٥	Cecal												16.7% 1
		sk	Retail Ground Turkey	50.6%	44.1%	43.0%	41.1%	44.6%	23.1%	37.1%	56.1%	33.3%	32.5%	27.4%	39.6%
		Turkeys	Cecal	45	52	74	44	62	15	26	37	15	13	20	0.0%
			Retail Ground Beef	11.8%	8.9%	9.3%	4.7%	7.2%	4.3%	13.7%	5.1%	6.6%	6.1%	3.3%	7.5%
		Cattle	Cecal (Beef)	11	10	15	6	9	3	10	3	4	5	3	6 3.7%
		రి	Cecal (Dairy)												0.0%
				20.4%	6.2%	5.3%	9.3%	7.1%	3.0%	14.3%	3.8%	9.4%	1.8%	1.9%	0 4.0%
		ЭЕ	Retail Pork Chops	19	6	4	7	5	1	5	1	3	4	1	16.7%
		Swine	Cecal (Market Hogs)												2
			Cecal (Sows)												14.3%

Percent non-susceptible is reported rather than percent resistance as no CLSI breakpoint has been established. NARMS breakpoint established to determine resistance.

3 Resistance data are not presented because there are no established CLSI breakpoints for daptomycin

Table 100c. Antimicrobial Resistance among Enterococcus faecium Isolates, 2002-2013 2008 2009 2010 2011 2012 2013 Retail Chickens 231 315 163 221 HACCP1 377 670 477 349 185 128 191 285 6 Retail Ground Turkey 89 118 172 107 139 65 70 66 45 40 73 18 Retail Ground Beef 93 112 162 129 125 69 73 59 61 82 80 Cecal (Beef) Cecal (Dairy) Retail Pork Chons 93 97 75 75 70 33 35 26 32 52 50 Cecal (Market Hogs) 12 Cecal (Sows) Antimicrobia (Resistance Breakpoint) Antimicrobial Class
Macrolides 21.2% 12.4% 19.09 27.7% Retail Chickens (MIC ≥ 32 µg/ml) 31 36 38 45 49 59 26.3% 17.7% 23.9% 26.6% 20.9% 28.3% 24.9% 17.5% 21.9% HACCP 99 100 160 127 73 54 16.7% Cecal 20.8% 36.0% 27.1% 35.5% 29.9% 36.0% 13.8% 12.9% 24.2% 15.6% 22.5% 17.8% Retail Ground Turkey Cecal 0.0% 6.5% 0.9% 5.6% 3.4% 3.7% 2.2% 5.0% 2.3% 4.8% 2.9% 4.1% 3.3% Retail Ground Beef 0.0% Cecal (Beef) 0.0% Cecal (Dairy) 0 9.7% 2.1% 0.0% 5.3% 5.7% 3.0% 5.7% 0.0% 3.1% 5 4% 0.0% 4 0% Retail Pork Chops 2 8.3% Cecal (Market Hogs) 14.3% Cecal (Sows) Nitrofurans Nitrofurantoin 54.5% 54.7% 38.4% 32.8% 46.0% 51.5% 40.1% 41.6% 36.6% 23.0% 85.3% Retail Chickens (MIC ≥ 128 µg/ml) 160 297 168 121 62 104 79 92 49 52.0% 59.2% 52.29 57.6% 51.9% 44.5% HACCP 196 334 366 249 176 110 96 141 57 0.0% 50.6% 52.5% 66.9% 43.0% 12.3% 40.9% 22.2% 40.0% 39.7% 29.2% 22.3% 27.1% Retail Ground Turkey 115 1/ Cecal 0.0% 18.3% 36.6% 51.9% 18.6% 12.8% 4.3% 20.5% 16.9% 6.6% 28.1% 22.0% 20.0% Retail Ground Beef 0.0% Cecal (Beef) 0.0% Cecal (Dairy) 5.4% 16.5% 37.3% 10.7% 4.3% 9.1% 8.6% 11.5% 6.3% 18 9% 5.8% 16.0% Retail Pork Chops 8 0.0% Cecal (Market Hogs) 0 0.0% Cecal (Sows) 0 Oxazolidinones Linezolid 0.0% 0.0% 0.3% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Chickens (MIC ≥ 8 µa/ml) 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% HACCP 0.0% Cecal 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Ground Turkey 0 Cecal 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Ground Beef 0.0% Cecal (Beef) 0.0% Cecal (Dairy) 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% Retail Pork Chons 0 0.0% Cecal (Market Hogs) 0 0.0% Cecal (Sows) Penicillins 44.2% 51.2% 39.1% 31.9% 22.2% 12.2% 27.6% 23.3% 24.4% 18.6% 11.9% 9.9% Retail Chickens (MIC ≥ 16 µg/ml) 102 127 136 98 70 45 47 48 41 21 42.2% 31.9% 35.2% 29.4% 35.0% 37.2% 34.6% 25.6% 24.2% HACCP 159 180 140 122 71 64 73 31 0.0% 54.2% 65.3% 61.6% 59.8% 67.6% 60.0% 61.4% 69.7% 48.9% 75.0% 68.5% 66.3% Retail Ground Turkey 26 0.0% Cecal 0.0% 8.0% 3.1% 2.3% 4.8% 1.4% 9.6% 6.8% 3.3% 3.7% 3.3% 5.0% Retail Ground Beef 0.0% Cecal (Beef) 0.0% Cecal (Dairy) 3.2% 1.0% 8.0% 1.3% 1.4% 0.0% 0.0% 7.7% 6.3% 2.7% 0.0% 4.0%

In 2012 and 2013, chicken carcass rinsates were not sampled for Enterococcus

Retail Pork Chops

Cecal (Market Hogs)

Cecal (Sows)

2 0.0%

0 42.9%

Table 100d	Antimicrobial R	esistance amone	- Enterococcus	faecium	leolates	2002-2013
Table Tuuu.	Antininici obiai N	esisianice annoni	a ⊑iilei UUUUUus	Iaeciuiii	isulates.	2002-2013

Seed Control Notes   Part   Seed Control Notes	Table 100d. Antimic	crobial Resistance ar	mong	Enterococcus faed	ium Iso	lates, 20	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Section   Continue	Number of Isolates Tested		sue													1
Security   Column			ş		0	377	564	670	477	349	191	185	285	128		6
Band Control Internal Profession   20			keys		89	118	172	107	139	65	70	66	45	40	73	
			Ţ													4
Part			Cattle	Cecal (Beef)	93	112	162	129	125	69	73	59	61	82	91	27
Control   Cont			Swine	Cecal (Market Hogs)	93	97	75	75	70	33	35	26	32	37	52	50
Marelandows   Marelandows				,												7
MacCo 120 years   MacCo 120	Antimicrobial Class	Breakpoint)														
Read Grown University   1970	Pnenicois		sus	Retail Chickens		0	0	0	0	0	1	0	0	0		
Read Grown University   1970			Chicke	HACCP												
Control County   Cont				Cecal												0
Resid Ground Bewel   1,110   0,070   1,22   0,070   0,070   0,070   1,410   0,070   1,410   0,070   1,410   0,070			rkeys	Retail Ground Turkey												0
Control Charles Service Control   1   20   2   2   3   5   5   1   4   1   1   1   1   1   1   1   1			ī	Cecal												0
Mindows   Part			Retail Ground Beef												1	
Minimination   Property   Prope			Cattle	Cecal (Beef)												0
Minimum				Cecal (Dairy)												0
Cocol   Coco			Φ	Retail Pork Chops												0
Control cont			Swin	Cecal (Market Hogs)												0
Miles   Concerns   Finder   Concerns   Finder   Concerns   Finder   Concerns   Finder   Concerns   Finder   Concerns   Finder				Cecal (Sows)												0
Cecial	Quinolones		SU	Retail Chickens		54	182	104	118	37	71	69	64	74		
Cecial			Chicke	HACCP												
Preparation   Preparation   Propagation			Ĺ	Cecal												3
Retail Ground Beef   12.9%   33.0%   37.2%   20.9%   21.8%   10.9%   26.9%   18.9%   14.8%   17.1%   12.1%   25.0%   20.9%   20.9%   19.9%   11   9   14   11   23.3%   23.3			keys	Retail Ground Turkey												17
Present Ground Ease   12   37   44   27   27   7   19   11   9   14   11   29   33.35   33.3			Ē	Cecal												2
Retail Port Chaps				Retail Ground Beef												20
Repail Portis Choirs   1.72			Cattle	Cecal (Beef)												9
Cocal (Markel Hogs)   Cocal (Markel Hogs)				Cecal (Dairy)												17
				Retail Pork Chops												8
Control (color)   Control (c			Swin	Cecal (Market Hogs)												3
MC 2 4 jujmin				Cecal (Sows)												0
Part	Streptogramins		su	Retail Chickens		148	110	120	115	108	89	101	57	71		
Cecal			Chicke	HACCP												
Retail Ground Beef			Ĺ	Cecal												2
Retail Ground Beef 47.3% 50.0% 6.2% 7.8% 64.% 58.% 16.4% 18.6% 0.0% 11.0% 26.4% 18.8% 8.0 2.0% 11.0% 26.4% 18.8% 8.0 2.0% 11.0% 26.4% 18.8% 8.0 2.0% 11.0% 26.4% 18.8% 8.0 2.0% 11.0% 26.4% 18.8% 8.0 2.0% 11.0% 26.4% 18.8% 8.0 2.0% 11.0% 26.4% 18.8% 8.0 2.20 2.20 2.20 2.20 2.20 2.20 2.20			keys	Retail Ground Turkey												20
Retail Glound Beel   44   56   10   10   8   4   12   11   0   9   24   15   29.6%			ī	Cecal												0
Retail Pork Chops   24,7%   64,9%   6.7%   13,3%   10,0%   3,0%   5,7%   19,2%   3,1%   13,5%   23,1%   6,0%   3,0%   5,7%   19,2%   3,1%   13,5%   23,1%   6,0%   3,0%   3,0%   5,7%   19,2%   3,1%   13,5%   23,1%   6,0%   3				Retail Ground Beef												15
Retail Pork Chops   24.7%   64.9%   6.7%   13.3%   10.0%   3.0%   5.7%   19.2%   3.1%   13.5%   23.1%   8.0%   6.0%   1			Cattle	Cecal (Beef)												8
Retail Fork Citolys   23   63   5   10   7   1   2   5   1   5   12   4				Cecal (Dairy)												3
Etracyclines    Tetracycline (MIC≥16 µg/ml)   Tetracycline (MIC=16		Φ	Retail Pork Chops												4	
Petracyclines   Tetracycline (MIC ≥ 16 µg/ml)   February   Febru			Swin	Cecal (Market Hogs)												3
MIC ≥ 16 µg/ml)   Metall Critickers   131   128   157   167   167   167   125   105   115   70   96   131   125	T			Cecal (Sows)												2
Cecal   Retail Ground Turkey   88.8%   91.5%   86.6%   91.6%   92.8%   96.9%   81.4%   92.4%   71.1%   82.5%   78.1%   75.0%	Tetracyclines		sus	Retail Chickens		128	157	167	167	125	105	115	70	96		
Cecal   Retail Ground Turkey   88.8%   91.5%   86.6%   91.6%   92.8%   96.9%   81.4%   92.4%   71.1%   82.5%   78.1%   75.0%			Chicke	HACCP												
Retail Ground Furney   79   108   149   98   129   63   57   61   32   33   57   36   25.0%   26.0%   27.0%   28.6%   24.7%   28.7%   20.0%   18.8%   28.8%   39.0%   27.9%   22.0%   23.1%   20.0%   29.6%			Ľ							0.7.7.	0.1	07.11	7			4
Retail Ground Beef			rkeys	Retail Ground Turkey												36
Retail Goldin Deel   21   32   40   37   25   13   21   23   17   18   21   16   29.6%   8   29.6%   29.6%   8   29.6%   29.			μ	Cecal		,										1
Cecal (Dairy)			an an	Retail Ground Beef												16
Retail Pork Chops 68.8% 69.1% 72.0% 56.0% 54.3% 33.3% 45.7% 50.0% 50.0% 48.7% 30.8% 64.0% 62.2% 64.67 54.42 38.11 16.13 16.18 16.18 16.32 Cecal (Market Hogs)  Cecal (Sows)  Cecal (Sows)  Cecal (Sows)			Cattle	Cecal (Beef)												8
Retail Folk Critics   64   67   54   42   38   11   16   13   16   18   16   32				Cecal (Dairy)												
Cecal (Sows) 71.4% 5			an an	Retail Pork Chops												32
Cetal (Julya) 5			Swine	Cecal (Market Hogs)												5
	1.															

<sup>1</sup> In 2012 and 2013, chicken carcass rinsates were not sampled for *Enterococcus* 

Table 101a. Resistance Par Year	.5.110		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested	Chickens	Retail Chickens HACCP <sup>1</sup>	231	248 377	348 564	307 670	315 477	189 349	163 191	202 185	197 285	221 128	235	213
		Cecal  Retail Ground Turkey	89	118	172	107	139	65	70	66	45	40	73	6 48
	Turkeys	Cecal	03	110	172	107	155		70	00	45	40	73	4
	Cattle	Retail Ground Beef Cecal (Beef) Cecal (Dairy)	93	112	162	129	125	70	73	59	61	82	91	80 27 34
	Swine	Retail Pork Chops Cecal (Market Hogs)	93	97	75	75	70	33	35	26	32	37	52	50 12
Resistance Pattern <sup>2</sup>		Cecal (Sows) Source												7
No Resistance Detected		Retail Chickens	3.5% 8	1.2% 3	1.1% 4	9.8%	10.8% 34	9.0% 17	4.9% 8	4.5% 9	6.1% 12	5.0% 11	3.4% 8	7.0% 15
The Residualist Betoeld	Chickens	HACCP	,	2.9%	3.0%	6.1% 41	6.5% 31	3.4% 12	3.1% 6	3.2%	3.2%	0.8%		
	ò	Cecal					0.	12	J					0.0%
	sys	Retail Ground Turkey	0.0%	0.0%	0.6%	0.0%	0.0%	1.5%	2.9%	1.5%	6.7%	5.0%	1.4%	2.1%
	Turkeys	Cecal	0	0		0	0		2		3			0.0%
		Retail Ground Beef	16.1%	10.7%	9.9%	9.3%	40.0%	38.6%	8.2%	3.4%	11.5%	7.3%	11.0%	15.0%
	Cattle	Cecal (Beef)	15	12	16	12	50	27	6	2	7	6	10	0.0%
	0	Cecal (Dairy)												2.9%
	-	Retail Pork Chops	4.3%	3.1%	1.3%	6.7%	21.4%	18.2%	17.1%	11.5%	15.6%	10.8%	5.8%	6.0%
	Swine	Cecal (Market Hogs)	4	3	1	5	15	6	6	3	5	4	3	3 8.3%
	Š	Cecal (Sows)												1 14.3%
2. Resistance to ≥ 3	1	Retail Chickens	71.9%	79.4%	75.9%	63.2%	53.3%	66.7%	63.8%	65.8%	48.7%	54.8%	60.0%	1 62.9%
Antimicrobial Classes	Chickens	HACCP	166	197 73.2%	264 73.0%	194 71.8%	168 75.1%	126 71.6%	104 78.0%	133 78.9%	96 71.2%	121 80.5%	141	134
	Chic	Cecal		276	412	481	358	250	149	146	203	103		66.7%
			86.5%	88.1%	91.9%	86.9%	93.5%	90.8%	85.7%	92.4%	75.6%	85.0%	84.9%	4 79.2%
	Turkeys	Retail Ground Turkey	77	104	158	93	130	59	60	61	34	34	62	38 25.0%
	F	Cecal	31.2%	40.2%	27.2%	15.5%	9.6%	7.2%	27.4%	20.3%	9.8%	20.7%	22.0%	1 16.3%
	e e	Retail Ground Beef	29	45	44	20	12	5	20	12	6	17	20	13
	Cattle	Cecal (Beef)												5
		Cecal (Dairy)	33.3%	54.6%	41.3%	21.3%	12.9%	3.0%	17.1%	23.1%	12.5%	16.2%	7.7%	5 18.0%
	9	Retail Pork Chops	31	53	31	16	9	1	6	6	4	6	4	9 41.7%
	Swine	Cecal (Market Hogs)												5
		Cecal (Sows)	10.101			10 701			- 1 - C 1	E0 101		10.101	11.00/	71.4% 5
3. Resistant to ≥ 4 Antimicrobial Classes	SL	Retail Chickens	49.4% 114	52.8% 131	52.6% 183	43.7% 134	36.5% 115	38.6% 73	51.5% 84	56.4% 114	38.1% 75	42.1% 93	44.3% 104	36.2% 77
	Chickens	HACCP		54.1% 204	52.7% 297	54.9% 368	57.0% 272	53.3% 186	60.7% 116	64.3% 119	56.1% 160	68.8% 88		
		Cecal												50.0% 3
	eys	Retail Ground Turkey	78.7% 70	72.9% 86	82.6% 142	73.8% 79	82.0% 114	75.4% 49	80.0% 56	86.4% 57	64.4% 29	75.0% 30	75.3% 55	64.6% 31
	Turkeys	Cecal												0.0% 0
		Retail Ground Beef	11.8% 11	18.8% 21	9.9% 16	6.2% 8	4.8% 6	4.3% 3	15.1% 11	13.6% 8	3.3% 2	7.3% 6	7.7% 7	8.8% 7
	Cattle	Cecal (Beef)												3.7% 1
		Cecal (Dairy)												2.9% 1
	_	Retail Pork Chops	8.6% 8	7.2% 7	12.0% 9	9.3% 7	4.3% 3	3.0% 1	5.7% 2	3.8% 1	9.4% 3	10.8% 4	0.0% 0	10.0% 5
	Swine	Cecal (Market Hogs)												25.0% 3
		Cecal (Sows)												57.1% 4
4. Resistant to ≥ 5 Antimicrobial Classes	S	Retail Chickens	30.3% 70	35.5% 88	28.7% 100	28.3% 87	16.8% 53	16.9% 32	34.4% 56	39.1% 79	25.4% 50	23.1% 51	19.6% 46	14.6% 31
	Chickens	HACCP		33.4% 126	31.7% 179	37.2% 249	36.3% 173	30.4% 106	43.5% 83	47.6% 88	34.0% 97	44.5% 57		
	L	Cecal												33.3% 2
	eys	Retail Ground Turkey	66.3% 59	68.7% 81	62.2% 107	57.0% 61	57.6% 80	38.5% 25	55.7% 39	65.2% 43	42.2% 19	62.5% 25	56.2% 41	43.8% 21
	Turkeys	Cecal												0.0%
		Retail Ground Beef	5.4% 5	8.0%	5.6% 9	4.7% 6	4.0% 5	0.0%	8.2% 6	1.7%	1.6%	3.7%	3.3%	5.0%
	Cattle	Cecal (Beef)	3				Ť	Ľ						0.0%
		Cecal (Dairy)												0.0%
		Retail Pork Chops	4.3%	5.2%	4.0%	6.7%	4.3%	0.0%	2.9%	3.8%	6.3%	8.1%	0.0%	4.0%
	Swine	Cecal (Market Hogs)	4	5	3	5	3	0	1	1	2	3	0	0.0%
	S	Cecal (Sows)												28.6%
<sup>1</sup> In 2012 and 2013, chicken carca	ss rins:		or Enteroc	occus										2

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, chicken carcass rinsates were not sampled for *Enterococcus*<sup>2</sup> Resistance patterns do not include daptomycin as there are no established CLSI breakpoints

Table 101b. Resistance Pa	tterns	among Enteroco												
Year Number of Isolates Tested	SI	Retail Chickens	<b>2002</b> 231	2003 248	<b>2004</b> 348	<b>2005</b> 307	<b>2006</b> 315	<b>2007</b> 189	<b>2008</b> 163	<b>2009</b> 202	<b>2010</b> 197	<b>2011</b> 221	2012 235	<b>2013</b> 213
Talliber of isolates rested	Chickens	HACCP <sup>1</sup> Cecal	231	377	564	670	477	349	191	185	285	128	200	6
	Turkeys	Retail Ground Turkey	89	118	172	107	139	65	70	66	45	40	73	48
	Cattle	Retail Ground Beef Cecal (Beef)	93	112	162	129	125	70	73	59	61	82	91	80 27
	ပိ	Cecal (Dairy)												34
	Swine	Retail Pork Chops Cecal (Market Hogs) Cecal (Sows)	93	97	75	75	70	33	35	26	32	37	52	50 12 7
Resistance Pattern <sup>2</sup>		Source												
4. Resistant to ≥ 6 Antimicrobial Classes		Retail Chickens	12.1% 28	12.9% 32	14.9% 52	15.0% 46	9.8% 31	10.6% 20	23.3% 38	14.4% 29	12.2% 24	11.8% 26	8.1% 19	7.5% 16
Anumiciobiai Classes	Chickens	HACCP	28	15.6%	15.2%	20.6%	17.8%	12.3%	25.1%	26.5%	15.4%	18.8%	19	10
	Ş	Cecal		59	86	138	85	43	48	49	44	24		16.7%
			47.2%	43.2%	44.8%	38.3%	30.9%	15.4%	30.0%	47.0%	24.4%	50.0%	32.9%	29.2%
	Turkeys	Retail Ground Turkey	42	51	77	41	43	10	21	31	11	20	24	14
	<u> </u>	Cecal	0.0%	4.5%	4.3%	0.0%	2.4%	0.0%	4.1%	1.7%	1.6%	2.4%	1.1%	3.8%
	e.	Retail Ground Beef	0	5	7	0	3	0	3	1	1	2	1	3
	Cattle	Cecal (Beef)												0
		Cecal (Dairy)												0.0%
		Retail Pork Chops	1.1% 1	1.0% 1	0.0% 0	2.7% 2	1.4% 1	0.0%	2.9% 1	3.9% 1	3.1% 1	2.7% 1	0.0% 0	4.0% 2
	Swine	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0.0%
6. At Least Pencillin G and High Level Gentamicin		Retail Chickens	1.7%	3.2% 8	3.5% 12	3.3% 10	3.2% 10	3.7% 7	7.4% 12	3.0%	2.5% 5	3.6% 8	0.9%	1.4%
riigii Level Gentaliiiciii	Chickens	HACCP	4	7.4%	3.9%	5.7%	6.1%	6.9%	7.9%	8.1%	4.9%	4.7%		,
	Ş	Cecal		28	22	38	29	24	15	15	14	6		0.0%
	ş,	Retail Ground Turkey	4.5%	7.6%	10.5%	9.4%	7.2%	1.5%	7.1%	13.6%	2.2%	5.0%	13.7%	2.1%
	Turkeys	Cecal	4	9	18	10	10	1	5	9	1	2	10	0.0%
	F		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	0.0%	0.0%	0.0%	0.0%
	ē	Retail Ground Beef	0	0	0	0	0	0	0	1	0	0	0	0.0%
	Cattle	Cecal (Beef)												0.0%
		Cecal (Dairy)		0.00/	0.004			0.00/			2 22/	0.004	0.00/	0
		Retail Pork Chops	0.0%	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0% 0	0.0% 0	0.0%
	Swine	Cecal (Market Hogs)												0.0% 0
		Cecal (Sows)												0.0%
7. At Least Pencillin G High Level Gentamicin,	s	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
and Linezolid Resistant	Chickens	HACCP		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
	ò	Cecal												0.0%
	ırkeys	Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Turke	Cecal	U	0		0	0		0		0		0	0.0%
		Retail Ground Beef	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	Cecal (Beef)	0	0	0	0	0	0	0	0	0	0	0	0.0%
	٥	Cecal (Dairy)												0.0%
		Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Swine	Cecal (Market Hogs)	0	0	0	0	0	0	0	0	0	0	0	0.0%
	νς	Cecal (Sows)												0.0%
8. At Least Pencillin G,		Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
High Level Gentamicin, and Tigecycline Resistant	sue:		0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0
	Chickens	HACCP		0.076	0.076	0.076	0.076	0.076	0	0.070	0.070	0.076		0.0%
	<u> </u>	Cecal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Turkeys	Retail Ground Turkey	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	12	Cecal	0.004	0.007	0.004	0.007	0.004	0.007	0.004	0.004	0.004	0.004	0.001	0
	0	Retail Ground Beef	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	Cecal (Beef)												0.0%
	L	Cecal (Dairy)												0.0%
		Retail Pork Chops	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0	0.0%
	Swine	Cecal (Market Hogs)												0.0%
	U	Cecal (Sows)												0.0%
1		İ												0

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, chicken carcass rinsates were not sampled for *Enterococcus*<sup>2</sup> Resistance patterns do not include daptomycin as there are no established CLSI breakpoints

#### MIC Distributions

		ccurrence among Entero	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		40 10014100	, 2012					D:-4-:1		0/) -6 8	110 - /··						
Antimicrobial Class	Antimicrobial Agent	Isolate Source (# of Isolates)	%l <sup>1</sup>	%R²	[95% CI] <sup>3</sup>	0.02 0.03	0.06 0.125	0.25	0.50	1	Distrib 2	ution (	%) of N 8	IICs (µ 16	g/ml)* 32 64	128	256	512	1024	2048 >2048
Aminoglycosides	Gentamicin	Retail Chickens (10)	N/A	20.0	[2.5 - 55.6]											80.0				20.0
		왕 Retail Ground Turkey (3)	N/A	0.0	[0.0 - 70.8]											100.0				
		Retail Ground Beef (57)	N/A	0.0	[0.0 - 6.3]											100.0				
		Retail Pork Chops (5)	N/A	0.0	[0.0 - 52.2]											100.0				
	Kanamycin	Retail Chickens (10)	N/A	20.0	[2.5 - 55.6]											80.0				20.0
		Retail Ground Turkey (3)	N/A	0.0	[0.0 - 70.8]											100.0				
		Retail Ground Beef (57)	N/A	0.0	[0.0 - 6.3]											100.0				
		Retail Pork Chops (5)	N/A	0.0	[0.0 - 52.2]											100.0				
	Streptomycin	Retail Chickens (10)	N/A	0.0	[0.0 - 30.8]													100.0		
		요한 Retail Ground Turkey (3)	N/A	0.0	[0.0 - 70.8]													100.0		
		Retail Ground Beef (57)	N/A	1.8	[0.0 - 9.4]													98.3		1.7
		Retail Pork Chops (5)	N/A	0.0	[0.0 - 52.2]													100.0		
Glycopeptides	Vancomycin	Retail Chickens (10)	0.0	0.0	[0.0 - 30.8]				10.0	90.0										
		용한 Retail Ground Turkey (3)	0.0	0.0	[0.0 - 70.8]			33.3	66.7											
		Retail Ground Beef (57)	0.0	0.0	[0.0 - 6.3]				63.2	36.8										
		Retail Pork Chops (5)	0.0	0.0	[0.0 - 52.2]				40.0	60.0										
	Tigecycline	Retail Chickens (10)	N/A	0.0	[0.0 - 30.8]		60.0 20.0	20.0												
		영 Retail Ground Turkey (3)	N/A	0.0	[0.0 - 70.8]	33.3 33.3		33.3												
		Retail Ground Beef (57)	N/A	0.0	[0.0 - 6.3]	14.0	49.1 29.8	7.0												
		Retail Pork Chops (5)	N/A	0.0	[0.0 - 52.2]		80.0 20.0													
Lincosamides	Lincomycin	Retail Chickens (10)	0.0	100.0	[69.2 - 100.0]									100.0						
		Retail Ground Turkey (3)	0.0	66.7	[9.4 - 99.2]					33.3				66.7						
		Retail Ground Beef (57)	0.0	93.0	[83.0 - 98.1]					7.0				93.0						
		Retail Pork Chops (5)	0.0	80.0	[28.4 - 99.5]					20.0				80.0						
Lipopeptides	Daptomycin <sup>5</sup>	Retail Chickens (10)	N/A	N/A	N/A					30.0	30.0	20.0	10.0	10.0						
		용한 Retail Ground Turkey (3)	N/A	N/A	N/A			33.3		33.3		33.3								
		Retail Ground Beef (57)	N/A	N/A	N/A					1.8	19.3	59.7	19.3							
		Retail Pork Chops (5)	N/A	N/A	N/A			L		20.0	20.0	60.0								
Macrolides	Erythromicin	Retail Chickens (10)	0.0	20.0	[2.5 - 55.6]			80.0					10.0	10.0						
		Retail Ground Turkey (3)	0.0	0.0	[0.0 - 70.8]			100.0												
		Retail Ground Beef (57)	0.0	14.0	[6.3 - 25.8]			86.0						14.0						
		Retail Pork Chops (5)			[0.5 - 71.6]			80.0						20.0						

Percent of isolates with intermediate susceptibility. NIA used when there is no intermediate breakpoint established.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

35% confidence intensals for percent resistant (%R) were calculated using the Clopper-Perason exact method

35% confidence intensals for percent resistant (%R) were calculated using the Clopper-Perason exact method

4The unshaded areas indicate the dilution range of the Sensitive plates used to test isolates. Single vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the lighest concentrations on the plates. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

5 There are no established CLSI breakpoints for daptomycin

Martinida   Principle   Prin	Table 102b. Distrib	ution of MICs and O	ccurrence among Enter Isolate Source	ососс	us hii	ae Isolates	s, 2012				Distri	bution	(%) of	MICs /	ug/ml) <sup>4</sup>						<del></del> ,
Procession   Pro	Antimicrobial Class			%l <sup>1</sup>	%R <sup>2</sup>	195% CII <sup>3</sup>	0.02 0.03 0.06	0.125 0.2	5 0.50	1	2	4	8	16	32	64	128 2	256 5	12 10	24 2048	8 >2048
Maria December 1971   15   15   15   15   15   15   15	Macrolides	i yiosin	Retail Chickens (10)	0.0	20.0	[2.5 - 55.6]					70.0	10.0				20.0					
Manufactions   Manu			Retail Ground Turkey (3)	0.0	0.0	[0.0 - 70.8]		33.	3		66.7										
March Control (1997)   180			Retail Ground Beef (57)	0.0	14.0	[6.3 - 25.8]				5.3	77.2	3.5				14.0					
President   President			Retail Pork Chops (5)	0.0	20.0	[0.5 - 71.6]				20.0	60.0					20.0					
Procedure   Proc	Nitrofurans	Nitrofurantoin		10.0	10.0	[0.3 - 44.5]									80.0	10.0	10.0				
Part   Part			ช Retail Ground Turkey (3)	33.3	0.0	[0.0 - 70.8]					33.3				33.3	33.3					
Decembration			Retail Ground Beef (57)	40.4	42.1	[29.1 - 55.9]								1.8	56.1	40.4	1.8				
Procedure   Proc			Retail Pork Chops (5)	20.0	0.0	[0.0 - 52.2]									80.0	20.0					
Precision   Precision   Precision   Read Ground Bard (67)   1.8   0.0   10.0   6.0   10.	Oxazolidinones	Linezolid		0.0	0.0	[0.0 - 30.8]			П	70.0	30.0										
Persocial Post Chapter (1)   20   20   20   20   20   20   20   2			Retail Ground Turkey (3)	0.0	0.0	[0.0 - 70.8]			33.3		66.7										
Perioditis   Perioditis   Perioditis   Secular Circulative (10)   NuA   18.0   10.3 - 44.5			Retail Ground Beef (57)	1.8	0.0	[0.0 - 6.3]				33.3	64.9	1.8									
Previous   Previous			Retail Pork Chops (5)	0.0	0.0	[0.0 - 52.2]				40.0	60.0										
Phenicols	Penicillins	Penicillin	Retail Chickens (10)	N/A	10.0	[0.3 - 44.5]		10.	0	20.0	40.0	10.0	10.0		10.0						
Previous   Section   Production   Section   Production   Section   Production   Section   Sect			Retail Ground Turkey (3)	N/A	0.0	[0.0 - 70.8]		33.	3	33.3	33.3										
Chioramphenicid   Secul Chiodens (10)   0.0   0.0   (0.0 - 30.8)			Retail Ground Beef (57)	N/A	0.0	[0.0 - 6.3]		12.	3 7.0	50.9	22.8	7.0									
Part   Characteristric   Control Character			Retail Pork Chops (5)	N/A	0.0	[0.0 - 52.2]				80.0	20.0										
Fig.   Felal Ground Beef (57)   0.0   0.	Phenicols	Chloramphenicol	Retail Chickens (10)	0.0	0.0	[0.0 - 30.8]						80.0	20.0								
Countoines   Coproficiacion   Serial Chickens (10)   Coproficiacion   Serial Chickens (10)   Coproficiacion   Serial Ground Turkey (3)   Coproficiacion   Serial Ground			용한 Retail Ground Turkey (3)	0.0	0.0	[0.0 - 70.8]					33.3	33.3	33.3								
Ciprofloxacin   Ciprofloxaci			Retail Ground Beef (57)	0.0	0.0	[0.0 - 6.3]						57.9	42.1								
Part   Chickers (10)   Chick			Retail Pork Chops (5)	0.0	0.0	[0.0 - 52.2]						40.0	60.0								
Part   Part	Quinolones	Ciprofloxacin	Retail Chickens (10)	0.0	0.0	[0.0 - 30.8]		40.	0 60.0												
Streptogramins   Quinupristin-Dallopristin   Quinupristin   Quinupristin-Dallopristin   Quinupristin-Dallopristi			Retail Ground Turkey (3)	0.0	0.0	[0.0 - 70.8]		33.3	66.7												
Culmpristin Dalfopristin   Dalfopristin Dalfopristin   Dalfopris			etail Ground Beef (57)	0.0	0.0	[0.0 - 6.3]			73.7	26.3											
Dalfopristin   Participant			Retail Pork Chops (5)	0.0	0.0	[0.0 - 52.2]			60.0	40.0											
Tetracyclines   Tetracycline	Streptogramins	Quinupristin- Dalfopristin	Retail Chickens (10)	60.0	20.0	[2.5 - 55.6]				20.0	60.0		10.0	10.0							
Tetracyclines   Tetracycline   February   Tetracycline   Tetracycline   February   Tetracycline		Retail Ground Turkey (3)	66.7	0.0	[0.0 - 70.8]			33.3		66.7											
Tetracyclines  Tetracycline    3			Retail Ground Beef (57)	71.9	12.3	[5.1 - 23.7]			8.8	7.0	71.9	12.3									
Retail Ground Turkey (3) 0.0 0.0 [0.0 - 70.8] 66.7 33.3 3.3 1.8 24.6 40.4			Retail Pork Chops (5)	40.0	20.0	[0.5 - 71.6]			20.0	20.0	40.0	20.0									
E Retail Ground Beef (57) 0.0 66.7 [52.9 - 78.6] 33.3 1.8 24.6 40.4	Tetracyclines	Tetracycline	Retail Chickens (10)	0.0	90.0	[55.5 - 99.7]				10.0					10.0	80.0					
•			Retail Ground Turkey (3)	0.0	0.0	[0.0 - 70.8]				66.7						33.3					
Retail Pork Chops (5) 0.0 80.0 [28.4 - 99.5] 20.0 20.0 60.0			Retail Ground Beef (57)	0.0	66.7	[52.9 - 78.6]				33.3				1.8	24.6	40.4					
			Retail Pork Chops (5)	0.0	80.0	[28.4 - 99.5]				20.0					20.0	60.0					

Fercent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with nesistance. Discrepancies between %R and sums of distribution %s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

395% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

The unshaded areas indicate the Sensitire plates used to test isolated. Single vertical lines indicate the breakpoints for susceptibility, while double vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

Table 103a. Distribution of MICs and Occurrence among Enterococcus hirae Isolates, 2013

Table 103a. Distrib	ution of MICs and Occ	currence among Enteroco	occus r	irae is	solates, 201	
Antimicrobial Class	Antimicrobial Agent	(# of Isolates)	%l <sup>1</sup>	%R <sup>2</sup>	[95% CI] <sup>3</sup>	Distribution (%) of MICs (ua/ml) <sup>4</sup>   0.02 0.03 0.06 0.125 0.25 0.50 1 2 4 8 16 32 64 128 256 512 1024 2048 >2
Aminoglycosides	Gentamicin	Retail Chickens (15)	N/A	26.7	[7.8 - 55.1]	73.3 13.3 13.3
		S Cecal (2)	N/A	0.0	[0.0 - 84.2]	100.0
		See Retail Ground Turkey (1)	N/A	0.0	[0.0 - 97.5]	100.0
		는 Cecal (0)	N/A	N/A	N/A	
			-			
		Retail Ground Beef (38)	N/A	0.0	[0.0 - 9.3]	100.0
		Cecal (Beef) (103)	N/A	0.0	[0.0 - 3.5]	100.0
		Cecal (Dairy) (70)	N/A	0.0	[0.0 - 5.1]	100.0
		Retail Pork Chops (2)	N/A	0.0	[0.0 - 84.2]	100.0
		Cecal (Market Hogs) (34)	N/A	0.0	[0.0 - 10.3]	100.0
		Cecal (Sows) (27)	N/A	0.0	[0.0 - 12.8]	100.0
	Kanamycin	Retail Chickens (15)  G Cecal (2)	N/A	26.7	[7.8 - 55.1]	73.3 26.7
		G Cecal (2)	N/A	0.0	[0.0 - 84.2]	100.0
		Retail Ground Turkey (1)	N/A	0.0	[0.0 - 97.5]	100.0
		Retail Ground Turkey (1) Cecal (0)	N/A	N/A	N/A	
		Retail Ground Beef (38)	N/A	0.0	[0.0 - 9.3]	100.0
		© Eccal (Beef) (103)	N/A	0.0	[0.0 - 3.5]	100.0
		Cecal (Dairy) (70)	N/A	0.0	[0.0 - 5.1]	100.0
			-			
		Retail Pork Chops (2)	N/A	0.0	[0.0 - 84.2]	100.0 97.1 <b>2.9</b>
			N/A	2.9	[0.1 - 15.3]	
		Cecal (Sows) (27)	N/A	3.7	[0.1 - 19.0]	96.3 3.7
	Streptomycin	Retail Chickens (15)	N/A	13.3	[1.7 - 40.5]	86.7
			N/A	0.0	[0.0 - 84.2]	100.0
		Retail Ground Turkey (1)	N/A	0.0	[0.0 - 97.5]	100.0
		물 Cecal (0)	N/A	N/A	N/A	
		Retail Ground Beef (38)	N/A	5.3	[0.6 - 17.7]	94.7
		© Cecal (Beef) (103)	N/A	1.0	[0.0 - 5.3]	99.0 1.0
		Cecal (Dairy) (70)	N/A	0.0	[0.0 - 5.1]	100.0
		Retail Pork Chops (2)	N/A	0.0		100.0
			N/A	5.9	[0.0 - 84.2]	
		Cecal (Market Hogs) (34) Cecal (Sows) (27)	N/A	29.6	[13.8 - 50.2]	94.1 2.9 2
Chicamantidae	Vanaamusia					70.4 11.1 11.1 7
Glycopeptides	Vancomycin	Retail Chickens (15)	0.0	0.0	[0.0 - 21.8]	26.7 73.3
			0.0	0.0	[0.0 - 84.2]	50.0 50.0
		Retail Ground Turkey (1)	0.0	0.0	[0.0 - 97.5]	100.0
		도 Cecal (0)	N/A	N/A	N/A	
		Retail Ground Beef (38)	0.0	0.0	[0.0 - 9.3]	2.6 39.5 57.9
		Cecal (Beef) (103)	0.0	0.0	[0.0 - 3.5]	62.1 37.9
		Cecal (Dairy) (70)	0.0	0.0	[0.0 - 5.1]	65.7 34.3
		Retail Pork Chops (2)	0.0	0.0	[0.0 - 84.2]	50.0 50.0
		Cecal (Market Hogs) (34)	0.0	0.0	[0.0 - 10.3]	73.5 20.6 5.9
		တ် Cecal (Sows) (27)	0.0	0.0	[0.0 - 12.8]	81.5 18.5
	Tigecycline	Retail Chickens (15)	N/A	0.0	[0.0 - 21.8]	6.7 46.7 46.7
	rigecycline	G Cecal (2)	N/A	0.0	[0.0 - 21.0]	50.0 50.0
			-			
		Retail Ground Turkey (1)  Cecal (0)	N/A	0.0	[0.0 - 97.5]	100.0
		E Cecal (0)	N/A	N/A	N/A	
		Retail Ground Beef (38)	N/A	0.0	[0.0 - 9.3]	13.2 44.7 36.8 5.3
		© Cecal (Beef) (103)	N/A	0.0	[0.0 - 3.5]	29.1 42.7 21.4 6.8
		Cecal (Dairy) (70)	N/A	0.0	[0.0 - 5.1]	34.3 45.7 14.3 5.7
		Retail Pork Chops (2)	N/A	0.0	[0.0 - 84.2]	50.0 50.0
		Cecal (Market Hogs) (34)	N/A	0.0	[0.0 - 10.3]	23.5 35.3 38.2 2.9
		တ် Cecal (Sows) (27)	N/A	0.0	[0.0 - 12.8]	7.4 40.7 37.0 14.8
Lincosamides	Lincomycin	g Retail Chickens (15)	0.0	100.0	[78.2 - 100.0]	<u> </u>
		장 Cecal (2)	0.0		[15.8 - 100.0]	
		Retail Ground Turkey (1)	0.0		[2.5 - 100.0]	100.0
		Secal (0)	N/A	100.0 N/A	[2.5 - 100.0] N/A	100.0
		F ''	- N/A	N/A		
		Retail Ground Beef (38)	0.0	92.1	[78.6 - 98.3]	
		Cecal (Beef) (103)	0.0	93.2	[86.5 - 97.2]	6.8 <b>93.2</b>
		Cecal (Dairy) (70)	0.0	94.3	[86.0 - 98.4]	4.3 1.4 92.9
	1	I	0.0	100.0	[15.8 - 100.0]	50.0 50.0
		Retail Pork Chops (2)	0.0	100.0	[15.6 - 100.0]	30.0
		Retail Pork Chops (2)  Cecal (Market Hogs) (34)	8.8	73.5	[55.6 - 87.1]	
		<u>o</u>				14.7 2.9 8.8 <b>73.5</b>

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established because there is no CLSI breakpoint established.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %'s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

39% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

4The unshaded areas indicate the dilution range of the Sensitire plates used to lest isolates. Single vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

Table 103b. Distrib	ution of MICs and Oc	currence among Enteroco	ccus h	nirae Is	olates, 201	3														
Antimicrobial Class	Antimicrobial Agent	Isolate Source (# of Isolates)	%l <sup>1</sup>	%R²	[95% CI] <sup>3</sup>	0.02 0.03 0.06 0.125	0.25 0	.50	1	Distril 2	oution 4	(%) of 8	MICs (	µg/ml)' 32		128	256	<u>512 1</u> 0	24 2048	>2048
Lipopeptides	Daptomycin <sup>5</sup>	- #	N/A	N/A	N/A				20.0	40.0	33.3	6.7								
		Retail Chickens (15) Cecal (2)	N/A	N/A	N/A					100.0										
			N/A	N/A	N/A					100.0										
		Retail Ground Turkey (1)	N/A	N/A	N/A															
		Retail Ground Beef (38)	N/A	N/A	N/A				2.6	21.1	47.4	23.7	5.3							
		Cecal (Beef) (103)	N/A	N/A	N/A				3.9		56.3		3.9							
		Cecal (Dairy) (70)	N/A	N/A	N/A					17.1			2.9							
		Datail Dayl, Chana (2)	NI/A																	
		Retail Pork Chops (2)  Cecal (Market Hogs) (34)	N/A N/A	N/A N/A	N/A N/A				5.9	14.7	100.0	8.8	2.9							
		Cecal (Sows) (27)	N/A	N/A	N/A				J.3		81.5		2.5							
Macrolides	Erythromicin		0.0	26.7	[7.8 - 55.1]		73.3	T			1	1	26.7							
	,	Retail Chickens (15)	0.0	0.0	[0.0 - 84.2]		100.0													
			0.0	0.0	[0.0 - 97.5]		100.0													
		Retail Ground Turkey (1) Cecal (0)	N/A	N/A	N/A		100.0													
		Retail Ground Beef (38)	0.0	21.1	[9.6 - 37.3]		78.9		4.0		4.0		21.1							
		Cecal (Beef) (103)	2.0	22.3	[14.7 - 31.6]		75.7		1.0		1.0	1.9	20.4							
		Cecal (Dairy) (70)	0.0	2.9	[0.3 - 9.9]		97.1						2.9							
		Retail Pork Chops (2)	50.0	0.0	[0.0 - 84.2]		50.0			0.0	50.0		44.							
		Cecal (Market Hogs) (34)	2.9	11.8	[3.3 - 27.5]		85.3			2.9		7.4	11.8							
	Tulogia	Cecal (Sows) (27)	0.0	29.6	[13.8 - 50.2]		70.4			66.7	6.7	7.4	22.2		20.7					
	Tylosin	Retail Chickens (15) Cecal (2)	0.0	26.7 0.0	[7.8 - 55.1] [0.0 - 84.2]					66.7 100.0	0.7				26.7					
		Retail Ground Turkey (1)	0.0	0.0	[0.0 - 97.5]					100.0										
		E Cecal (0)	N/A	N/A	N/A															
		Retail Ground Beef (38)	0.0	21.1	[9.6 - 37.3]				5.3	57.9	15.8				21.1					
		Cecal (Beef) (103)	0.0	23.3	[15.5 - 32.7]				1.0		10.7				23.3					
		Cecal (Dairy) (70)	0.0	2.9	[0.3 - 9.9]			1	12.9	78.6	5.7				2.9					
		Retail Pork Chops (2)	0.0	0.0	[0.0 - 84.2]						100.0									
		Cecal (Market Hogs) (34)	0.0	11.8	[3.3 - 27.5]				8.8	58.8					11.8					
		Cecal (Sows) (27)	0.0	29.6	[13.8 - 50.2]					55.6	14.8				29.6	_				
Nitrofurans	Nitrofurantoin	Retail Chickens (15)  Cecal (2)	33.3	13.3	[1.7 - 40.5]									53.3	33.3	13.3				
			0.0	0.0	[0.0 - 84.2]									100.0						
		Retail Ground Turkey (1) Cecal (0)	100.0	0.0	[0.0 - 97.5]										100.0					
		☐ Cecal (0)	N/A	N/A	N/A															
		Retail Ground Beef (38)	44.7	2.6	[0.1 - 13.8]								2.6	50.0	44.7	2.6				
		Cecal (Beef) (103)	32.0	0.0	[0.0 - 3.5]								4.9	63.1	32.0					
		Cecal (Dairy) (70)	18.6	1.4	[0.0 - 7.7]								5.7	74.3	18.6	1.4				
		Retail Pork Chops (2)	50.0 44.1	0.0	[0.0 - 84.2]								0 0	50.0	50.0					
		Cecal (Market Hogs) (34) Cecal (Sows) (27)	63.0	0.0 3.7	[0.0 - 10.3] [0.1 - 19.0]								0.0	47.1 33.3						
Oxazolidinones	Linezolid		0.0	0.0	[0.0 - 21.8]			-	73.3	26.7				00.0	00.0	· · · ·				
CXUZONUMONES	Emozona	Retail Chickens (15)  Cecal (2)	0.0	0.0	[0.0 - 84.2]				0.0	100.0										
			0.0	0.0	[0.0 - 97.5]					100.0										
		Retail Ground Turkey (1) Cecal (0)	0.0	0.0	[0.0 - 100.0]					100.0										
		Retail Ground Beef (38)	0.0	0.0	[0.0 - 9.3]					65.8 55.3										
		Cecal (Beef) (103) Cecal (Dairy) (70)	0.0	0.0	[0.0 - 3.5] [0.0 - 5.1]					57.1										
			•																	
		Retail Pork Chops (2)	0.0	0.0	[0.0 - 84.2]		,	20 2		100.0										
		Cecal (Market Hogs) (34) Cecal (Sows) (27)	0.0	0.0	[0.0 - 10.3] [0.0 - 12.8]		4	2.9 3		55.6										
Penicillins	Penicillin	2	N/A	13.3	[1.7 - 40.5]					46.7	13.3	13.3		13.3						
2,110111110	. 3.10	Retail Chickens (15)	N/A	0.0	[0.0 - 84.2]		50.0	,	. 5.5	50.0	. 5.5	.0.0		. 5.0						
			N/A	0.0	[0.0 - 97.5]					100.0										
		Retail Ground Turkey (1)  Cecal (0)	N/A	N/A	[0.0 - 97.5]					100.0										
		Retail Ground Beef (38)	N/A	0.0	[0.0 - 9.3]					44.7		4.0								
		Cecal (Beef) (103)	N/A	0.0	[0.0 - 3.5]					26.2		1.0								
		Cecal (Dairy) (70)	N/A	0.0	[0.0 - 5.1]			U.U 5	0.00	28.6	გ.ც									
		Retail Pork Chops (2)	N/A	0.0	[0.0 - 84.2]		50.0			50.0										
		Cecal (Market Hogs) (34)	N/A	0.0	[0.0 - 10.3]		15.2 2					2 7								
1.0		Cecal (Sows) (27) hen there is no intermediate breakpoint esta	N/A	7.4	[0.9 - 24.3]		7.4 1	<b>გ</b> .5 2	25.9	29.6	7.4	3.7	3.7	3.7						

<sup>&</sup>lt;sup>1</sup> Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent in solates with intermediate susceptions. NA used when time is no intermediate breakpoint established.

2 Percent of solates with resistance. Discrepancies between 9kR and sums of distribution 9ks are due to rounding. Percent (%) non-susceptible is reported rather than 9kR for daptomycin and tigecycline because there is no CLSI breakpoint established.

3 Soc confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method.

4 The unshaded areas indicate the dilution range of the Sensititre plates used to test isolates. Single vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

<sup>&</sup>lt;sup>5</sup> There are no established CLSI breakpoints for daptomycin

Table 103c. Distribution of MICs and Occurrence among Enterococcus hirae Isolates, 2013

Antimicrobial Class	Antimicrobial Agent		Isolate Source (# of Isolates)	%l <sup>1</sup>	%R²	[95% CI] <sup>3</sup>	0.02 0.03 0.06	0.125 0.25	0.50	1	Distri 2	bution 4	(%) of 8	MICs ( 16	µg/ml) 32	64	128	256	512	1024	2048 >20
Phenicols	Chloramphenicol	ken	Retail Chickens (15)	0.0	0.0	[0.0 - 21.8]						73.3	26.7								
	S.noramphanicui	Chicken	Cecal (2)	0.0	0.0	[0.0 - 84.2]						100.0									
			Retail Ground Turkey (1)	0.0	0.0	[0.0 - 97.5]							100.0								
		Turkeys	Cecal (0)	0.0	0.0	[0.0 - 100.0]															
			Retail Ground Beef (38)	0.0	0.0	[0.0 - 9.3]						68.4	31.6								
		Cattle	Cecal (Beef) (103)	0.0	0.0	[0.0 - 3.5]						61.2									
		0	Cecal (Dairy) (70)	0.0	0.0	[0.0 - 5.1]						95.7	4.3								
			Retail Pork Chops (2)	0.0	0.0	[0.0 - 84.2]						50.0	50.0								
		Swine	Cecal (Market Hogs) (34)	0.0	2.9	[0.1 - 15.3]						82.4	14.7			2.9					
		S	Cecal (Sows) (27)	0.0	0.0	[0.0 - 12.8]						59.3	40.7								
Quinolones	Ciprofloxacin	kens	Retail Chickens (15)	0.0	0.0	[0.0 - 21.8]		13.3	80.0	6.7											
		Chicken	Cecal (2)	0.0	0.0	[0.0 - 84.2]		50.0	50.0												
		_	Retail Ground Turkey (1)	0.0	0.0	[0.0 - 97.5]			100.0												
		Turkeys	Cecal (0)	0.0	0.0	[0.0 - 100.0]															
			Retail Ground Beef (38)	0.0	0.0	[0.0 - 9.3]		2.6	60.5	36.8											
		Cattle	Cecal (Beef) (103)	0.0	0.0	[0.0 - 3.5]		1.9	53.4												
		Ö	Cecal (Dairy) (70)	0.0	0.0	[0.0 - 5.1]		1.4	67.1	31.4											
			Retail Pork Chops (2)	0.0	0.0	[0.0 - 84.2]			50.0												
		Swine	Cecal (Market Hogs) (34)	2.9	0.0	[0.0 - 04.2]		2.9	61.8	32.4	2.9										
		Ó	Cecal (Sows) (27)	0.0	0.0	[0.0 - 12.8]			74.1	25.9											
Streptogramins	Quinupristin-Dalfopristin	kens	Retail Chickens (15)	60.0	40.0	[16.3 - 67.7]					60.0	13.3	13.3	13.3							
		Chickens	Cecal (2)	50.0	50.0	[1.3 - 98.7]					50.0		50.0								
		eys	Retail Ground Turkey (1)	100.0	0.0	[0.0 - 97.5]					100.0										
		Turkeys	Cecal (0)	0.0	0.0	[0.0 - 100.0]															
			Retail Ground Beef (38)	73.7	15.8	[6.0 - 31.3]			7.9	2.6	73.7	15.8									
		Cattle	Cecal (Beef) (103)	71.9	14.6	[8.4 - 22.9]			8.7	4.9	71.9	13.6	1.0								
		O	Cecal (Dairy) (70)	78.6	2.9	[0.3 - 9.9]			5.7	12.9	78.6	2.9									
			Retail Pork Chops (2)	100.0	0.0	[0.0 - 84.2]					100.0										
		Swine	Cecal (Market Hogs) (34)	50.0	20.6	[8.7 - 37.9]			14.7	14.7	50.0	8.8	8.8	2.9							
		L	Cecal (Sows) (27)	63.0	25.9	[11.1 - 46.3]			3.7	7.4	63.0	14.8	11.1								
Tetracyclines	Tetracycline	Chicken	Retail Chickens (15)	0.0	80.0	[51.9 - 95.7]				20.0				13.3		66.7					
		Shi	Cecal (2)	0.0	50.0	[1.3 - 98.7]				50.0						50.0					
		Turkeys	Retail Ground Turkey (1)	0.0	100.0	[2.5 - 100.0]										100.0					
		Tur	Cecal (0)	0.0	0.0	[0.0 - 100.0]															
			Retail Ground Beef (38)	0.0	68.4	[51.3 - 82.5]				31.6				2.6	10.5	55.3					
		Cattle	Cecal (Beef) (103)	0.0	59.2	[49.1 - 68.8]				40.8				1.0	11.7	46.6					
		Ľ	Cecal (Dairy) (70)	0.0	44.3	[32.4 - 56.7]															
		_	Retail Pork Chops (2)	0.0	100.0	[15.8 - 100.0]										100.0					
		Swine	Cecal (Market Hogs) (34)	0.0	61.8	[43.6 - 77.8]				38.2					5.9	55.9					
		0)	Cecal (Sows) (27)	0.0	81.5	[61.9 - 93.7]				18.5						81.5					

Percent of isolates with intermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with nitermediate susceptibility. N/A used when there is no intermediate breakpoint established.

Percent of isolates with resistance. Discrepancies between %R and sums of distribution %s are due to rounding. Percent (%) non-susceptible is reported rather than %R for daptomycin and tigecycline because there is no CLSI breakpoint established.

365% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

The unshaded areas indicate the dilution range of the Senatitre plates used to test iscolates. Single vertical lines indicate the breakpoints for resistance. Numbers in the shaded areas indicate percentage of isolates with MIC's greater than the highest concentrations on the plate. Numbers listed for the lowest tested concentrations represent the percentage of isolates with MIC's equal to or less than the lowest tested concentration.

Table 104a. Antimicrobial Resistance among *Enterococcus hirae* Isolates, 2002-2013

Number of Isolates Tested   Earli Chickens   12   28   27   30   27   22   16   8   24	18 39 0 44 2	10 3 57	15 2 1 0 38 103 70 2 34
Retail Ground Turkey   2   3   0   1   3   2   0   0   2	0 44 2 11.1%	57	1 0 38 103 70 2
Retail Ground Turkey   2   3   0   1   3   2   0   0   2	2	57	1 0 38 103 70 2
Retail Ground Beef Cecal (Beef) Cecal (Beef) Cecal (Barl)   Part of the composition of	2	57	0 38 103 70 2
Cecal (Beef)   Cecal (Dairy)	2 11.1%		103 70 2
$ \frac{\text{Retail Pork Chops}}{\text{Cecal (Market Hogs)}} \frac{12}{\text{Cecal (Market Hogs)}} \frac{12}{Cecal ($	11.1%	5	70 2
Retail Pork Chops   12   14   14   4   8   6   5   2   7	11.1%	5	2
Cecal (Market Hogs)   Cecal (Market Hogs)			34
Antimicrobial (Resistance Breakpoint)   Source   Sourc			
Antimicrobial Class   Breakpoint)   Source			27
(MIC >500 μg/ml)			
HACCP 14.5% 9.9% 7.7% 7.6% 7.3% 14.3% 11.3% 8.9% 5 6 5 5	2	20.0%	26.7% 4
Cecal	17.9% 7		
			0.0%
Retail Ground Turkey 0.0% 0.0% 0.0% 33.3% 0.0% 0.0% 0.0%		0.0%	0.0%
Retail Ground Turkey 0.0% 0.0% 0.0% 33.3% 0.0% 0.0% 0.0% 0.0		0	0
Retail Ground Beef 0.0% 0.0% 0.0% 1.2% 1.3% 0.0% 0.0% 0.0% 0.0%	0.0%	0.0%	0.0%
	0	0	0.0%
Cecal (Dairy)			0.0%
Retail Pork Chops 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0	0.0%	0.0%	0.0%
	0	0	0.0%
Cecal (Market Hogs)			0.0%
Cecal (Sows)	40.70/	20.00/	0
Kanamycin (MIC ≥ 1024 μg/ml)   Retail Chickens   16.7%   28.6%   3.7%   26.7%   3.7%   18.2%   12.5%   12.5%   4.2%   12.5	16.7%	20.0%	26.7% 4
(MIC ≥ 1024 μg/ml)	23.1% 9		
Cecal			0.00%
Retail Ground Turkey 0.0% 66.7% 0.0% 33.3% 0.0% 0.0% 0 Cecal		0.0% 0	0.0%
Cecal Cecal			
Retail Ground Beef 0.0% 3.6% 0.0% 1.2% 1.3% 0.0% 2.0% 0.0% 0.0% 0.0% 3 0 1 1 0 1 0 0	0.0%	0.0%	0.0%
Cecal (Beef)			0.00%
Cecal (Dairy)			0.00%
Retail Pork Chops 0.0% 0.0% 7.1% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0%	0.0%	0.0%	0.0%
	0	0	2.9%
Cecal (Sows)			3.7%
Streptomycin Pedral Chickons 16.7% 42.9% 22.2% 23.3% 18.5% 9.1% 25.0% 25.0% 8.3%	5.6%	0.0%	13.3%
(MIC ≥ 1000 μg/ml) 2 12 6 7 5 2 4 2 2 HACCP 36.1% 16.8% 27.2% 8.4% 11.8% 2.9% 1.9% 5.4%	2.6%	0	2
30 17 46 10 13 1 1 3	1		0.0%
		0.0%	0.0%
Recall Glound Turkey 1 0 0 1 0 0		0	0
	0.00/	4.00/	5.00/
Retail Ground Beef 2.6% 3.6% 0.0% 4.9% 2.6% 1.8% 0.0% 0.0% 0.0% 0.0% 2 3 0 4 2 1 0 0 0 0	0.0% 0	1.8% 1	5.3%
Cecal (Beef)			1.0%
Cecal (Dairy)			0.0%
Retail Pork Chops 0.0% 0.0% 0.0% 25.0% 0.0% 16.7% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0	50.0% 1	0.0%	0.0%
Cecal (Market Hogs)			5.9% 2
Cecal (Sows)			29.6%
Glycopeptides Vancomycin (MIC ≥ 32 μg/ml) g Retail Chickens 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0	0.0%	0.0%	0.0%
HACCP 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0	0.0%		
Cecal 0 0 0 0 0 0 0 0	0		0.0%
Retail Ground Turkey 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0%		0.0%	0.0%
Retail Ground Turkey 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0	0
Retail Ground Reef 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0	0.0%	0.0%	0.0%
Retail Ground Beer   0   0   0   0   0   0   0   0	0	0	0.0%
Geal (Beef)			0.0%
Cecal (Dairy)	0.0%	0.0%	0.0%
Retail Folk Chiques   0   0   0   0   0   0   0   0	0.0%	0.0%	0
Cecal (Market Hogs)			0.0%
Cecal (Sows)  1 In 2012 and 2013, chicken carcass rinsates were not sampled for Enterococcus			0.0%

In 2012 and 2013, chicken carcass rinsates were not sampled for Enterococcus

Number of Isolates Tested				2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
runiber of isolates rested		Chickens	Retail Chickens HACCP <sup>1</sup>	12	28 83	27 101	30 169	27 119	22 110	16 35	8 53	24 56	18 39	10	15
		Turkeys	Retail Ground Turkey Cecal	2	3	0	1	3	2	0	0	2	0	3	1 0
		Cattle	Retail Ground Beef Cecal (Beef)	76	84	88	82	77	57	49	26	41	44	57	38 103
		Swine	Cecal (Dairy)  Retail Pork Chops  Cecal (Market Hogs)	12	14	14	4	8	6	5	2	7	2	5	70 2 34
	Antimicrobial	Ø	Cecal (Sows)												27
	(Resistance		Isolate												
Antimicrobial Class Glycylcycline	Breakpoint) Tigecycline		Source Retail Chickens				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	(MIC ≥ 0.25 μg/ml) <sup>2</sup>	Chickens	HACCP				0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0
		Chic	Cecal					0	0	0	0	0	0		0.0%
		s	Retail Ground Turkey				0.0%	0.0%	0.0%			0.0%		0.0%	0.0%
		Turkeys					0	0	0			0		0	0
		_	Cecal				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		ē	Retail Ground Beef				0	0	0	0	0	0	0	0	0.0%
		Cattle	Cecal (Beef)												0.0%
		-	Cecal (Dairy)				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		e e	Retail Pork Chops				0.076	0.076	0.076	0.076	0.076	0.076	0.078	0.076	0.0%
		Swine	Cecal (Market Hogs)												0
			Cecal (Sows)												0.0% 0
Lincosamides	Lincomycin (MIC ≥ 8 µg/mI)	SU	Retail Chickens	100.0% 12	100.0% 28	92.6% 25	100.0% 30	77.8% 21	95.5% 21	100.0% 16	100.0% 8	100.0% 24	100.0% 18	100.0% 10	100.0% 15
		Chickens	HACCP		100.0% 83	100.0% 101	98.8% 167	98.3% 117	100.0% 110	100.0% 35	100.0% 53	98.2% 55	100.0% 39		
		O	Cecal												100.0%
		sys	Retail Ground Turkey	100.0% 2	100.0%		100.0% 1	100.0% 3	100.0% 2			50.0% 1		66.7% 2	100.0% 1
		Turkeys	Cecal		3		,	3							
			Retail Ground Beef	93.4%	91.7%	85.2%	98.8%	81.8%	96.5%	91.8%	88.5%	95.1%	84.1%	93.0%	92.1%
		Cattle	Cecal (Beef)	71	77	75	81	63	55	45	23	39	37	53	35 93.2%
		ပိ													96 94.3%
			Cecal (Dairy)	100.0%	100.0%	71.4%	100.0%	87.5%	83.3%	100.0%	100.0%	100.0%	100.0%	80.0%	66 100.0%
		9	Retail Pork Chops	12	14	10	4	7	5	5	2	7	2	4	73.5%
		Swine	Cecal (Market Hogs)												25
			Cecal (Sows)												92.6% 25
Lipopeptides	Daptomycin <sup>3</sup>	SI	Retail Chickens			-	-	-	-	-	-	-	-	-	-
		Chickens	HACCP			-	-	-	-	-	-	-	-		
		Ö	Cecal												-
		sk	Retail Ground Turkey				-	-	-			-		-	-
		Turkeys	Cecal												
		_	Retail Ground Beef			-	-	-	-			-	-	-	-
		Cattle	Cecal (Beef)												_
		Š													
			Cecal (Dairy)												-
		Ф	Retail Pork Chops			-	-	-	-	•	•	-	-	-	-
		Swine	Cecal (Market Hogs)												-
			Cecal (Sows)												-
Macrolides	Erythromycin (MIC ≥ 8 µg/ml)	s <sub>o</sub>	Retail Chickens	16.7% 2	67.9% 19	11.1% 3	63.3% 19	14.8% 4	45.5% 10	37.5% 6	25.0% 2	41.7% 10	16.7% 3	20.0%	26.7% 4
		Chickens	HACCP		53.0% 44	44.6% 45	37.3% 63	32.8% 39	32.7% 36	22.9% 8	35.8% 19	17.9% 10	17.9% 7		
		ن	Cecal												0.0%
		ys.	Retail Ground Turkey	0.0%	66.7%		0.0%	66.7%	0.0%			50.0%		0.0%	0.0%
		Turkeys	Cecal	0	2		0	2	0			1		0	0
		H	Retail Ground Beef	19.7%	15.5%	8.0%	17.1%	14.3%	17.5%	12.2%	3.8%	14.6%	13.6%	14.0%	21.1%
		te e		15	13	7	14	11	10	6	1	6	6	8	8 22.3%
		Cattle	Cecal (Beef)												23
			Cecal (Dairy)	0.051	7.40	0.051	05.00	05.00	20.000	00.000	0.001	0.051	F0.000	00.000	2
		1	Retail Pork Chops	0.0%	7.1% 1	0.0%	25.0% 1	25.0% 2	33.3% 2	60.0%	0.0%	0.0%	50.0%	20.0%	0.0%
				U	_	0	_			3	0	U	1		
		Swine	Cecal (Market Hogs)	U			,		2	3	0	0	1	1	11.8% 4

<sup>&</sup>lt;sup>2</sup> Percent non-susceptible is reported rather than percent resistance as no CLSI breakpoint has been established. NARMS breakpoint established to determine resistance

 $<sup>^{\</sup>rm 3}$  Resistance data are not presented because there are no established CLSI breakpoints for daptomycin

	robial Resistance an	nong	Enterococcus hira												
Year		ω	Retail Chickens	<b>2002</b> 12	<b>2003</b> 28	<b>2004</b> 27	<b>2005</b> 30	<b>2006</b> 27	<b>2007</b> 22	<b>2008</b> 16	<b>2009</b> 8	<b>2010</b> 24	<b>2011</b> 18	<b>2012</b> 10	<b>2013</b> 15
Number of Isolates Teste	ea	Chickens	HACCP <sup>1</sup> Cecal	12	83	101	169	119	110	35	53	56	39	10	2
		Turkeys	Retail Ground Turkey Cecal	2	3	0	1	3	2	0	0	2	0	3	1
		Cattle	Retail Ground Beef Cecal (Beef) Cecal (Dairy)	76	84	88	82	77	57	49	26	41	44	57	38 103 70
		Swine	Retail Pork Chops Cecal (Market Hogs)	12	14	14	4	8	6	5	2	7	2	5	2 34
Autiminahial Class	Antimicrobial (Resistance Breakpoint)		Cecal (Sows) Isolate Source												27
Antimicrobial Class Macrolides	Tylosin		Retail Chickens	16.7%	64.3%	11.1%	60.0%	18.5%	45.5%	37.5%	25.0%	41.7%	16.7%	20.0%	26.7%
	(MIC ≥ 32 μg/ml)	Chickens	HACCP	2	18 53.0% 44	3 46.5% 47	18 37.3% 63	33.6% 40	10 32.7% 36	6 22.9% 8	2 35.8% 19	10 17.9% 10	3 12.8% 5	2	4
		O	Cecal												0.0%
		Turkeys	Retail Ground Turkey	0.0%	66.7% 2		0.0%	66.7% 2	0.0%			50.0% 1		0.0% 0	0.0%
		Tur	Cecal												
			Retail Ground Beef	19.7% 15	15.5% 13	8.0% 7	17.1% 14	15.6% 12	19.3% 11	12.2% 6	3.8% 1	14.6% 6	13.6% 6	14.0% 8	21.1% 8
		Cattle	Cecal (Beef)												23.3% 24
			Cecal (Dairy)												2.9% 2
			Retail Pork Chops	0.0% 0	7.1% 1	0.0% 0	25.0% 1	25.0% 2	33.3% 2	40.0% 2	0.0% 0	0.0% 0	50.0% 1	20.0% 1	0.0% 0
		Swine	Cecal (Market Hogs)												11.8% 4
			Cecal (Sows)												29.6% 8
Nitrofurans	Nitrofurantoin (MIC ≥ 128 µg/mI)	sı	Retail Chickens	8.3% 1	10.7% 3	14.8% 4	6.7% 2	7.4% 2	0.0% 0	0.0% 0	0.0% 0	4.2% 1	5.6% 1	10.0% 1	13.3% 2
		Chickens	HACCP		15.7% 13	13.9% 14	7.1% 12	17.6% 21	11.8% 13	8.6% 3	9.4% 5	7.1% 4	5.1% 2		
			Cecal												0.0% 0
		Turkeys	Retail Ground Turkey	50.0% 1	0.0%		0.0%	66.7% 2	0.0%			0.0% 0		0.0% 0	0.0% 0
		TuT	Cecal												
			Retail Ground Beef	0.0% 0	0.0%	6.8% 6	4.9% 4	0.0% 0	0.0%	0.0% 0	0.0%	0.0% 0	2.3% 1	1.8% 1	2.6% 1
		Cattle	Cecal (Beef)												0.0% 0
			Cecal (Dairy)												1.4% 1
			Retail Pork Chops	0.0% 0	7.1% 1	21.4% 3	25.0% 1	0.0% 0	0.0% 0	20.0% 1	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0
		Swine	Cecal (Market Hogs)												0.0% 0
			Cecal (Sows)												3.7% 1
Oxazolidinones	Linezolid (MIC ≥ 8 µg/ml)	SL	Retail Chickens	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0%
		Chicker	HACCP		0.0%	0.0%	0.0%	0.0% 0	0.0% 0	0.0%	0.0%	0.0% 0	0.0%		
		Ĺ	Cecal												0.0%
		Turkeys	Retail Ground Turkey	0.0%	0.0%		0.0%	0.0%	0.0%			0.0%		0.0%	0.0%
		2	Cecal												
		Φ	Retail Ground Beef	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.00/	0.0%
		0	Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Swine	Cecal (Market Hogs)												0.0%
Penicillins	Desirilia		Cecal (Sows)	0.20/	7.40/	25.00/	0.00/	7.40/	4.50/	0.00/	0.00/	0.20/	F C0/	40.00/	0.0%
remonins	Penicillin (MIC ≥ 16 μg/mI)	sue	Retail Chickens	8.3% 1	7.1%	25.9% 7 6.9%	0.0% 0 3.6%	7.4% 2 5.0%	4.5% 1 5.5%	0.0%	0.0% 0 5.7%	8.3% 2 10.7%	5.6%	10.0%	13.3%
		Chickens	HACCP		8.4% 7	7	6	6	6	8.6%	3	10.7%	2.6%		0.0%
			Cecal	0.0%	0.0%		0.0%	66.7%	100.0%			0.0%		0.0%	0.0%
		Turkeys	Retail Ground Turkey  Cecal	0.0%	0.0%		0.0%	2	2			0.0%		0.0%	0.0%
		F	Retail Ground Beef	0.0%	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)	0	0	1	0	0	0	0	0	0	0	0	0.0%
		ő	Cecal (Dairy)												0.0%
			Retail Pork Chops	0.0%	0.0%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Swine	Cecal (Market Hogs)	0	0	1	0	0	0	0	0	0	0	0	0.0%
		Ś	Cecal (Sows)												7.4%
<sup>1</sup> In 2012 and 2013, chicke															2

<sup>1</sup> In 2012 and 2013, chicken carcass rinsates were not sampled for *Enterococcus* 

	Table 104d. Antim	icrobial Resistance amon	a Enterococcus hira	e Isolates.	2002-2013
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	obiai Resistance amo	ong	Enterococcus hira				2005	2000	2007	2000	2000	2040	2014	2042	2042
Year Number of Isolates Tested		SL	Retail Chickens	<b>2002</b> 12	<b>2003</b> 28	<b>2004</b> 27	<b>2005</b> 30	<b>2006</b> 27	<b>2007</b> 22	<b>2008</b> 16	<b>2009</b> 8	<b>2010</b> 24	<b>2011</b> 18	<b>2012</b> 10	<b>2013</b> 15
		Chickens	HACCP <sup>1</sup>		83	101	169	119	110	35	53	56	39		
		S C	Cecal												2
		urke	Retail Ground Turkey Cecal	2	3	0	1	3	2	0	0	2	0	3	1 0
		_	Retail Ground Beef	76	84	88	82	77	57	49	26	41	44	57	38
		Cattle	Cecal (Beef)		0.		02		0.		20			0.	103
			Cecal (Dairy)	-											70
		Swine	Retail Pork Chops Cecal (Market Hogs)	12	14	14	4	8	6	5	2	7	2	5	2 34
		Ś	Cecal (Sows)												27
	Antimicrobial (Resistance		Isolate												
Antimicrobial Class Phenicols	Breakpoint) Chloramphenicol		Source	0.0%	0.0%	0.0%	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	(MIC ≥ 32 μg/ml)	sus	Retail Chickens	0	0	0.0%	1 0.0%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0	0
		Chickens	HACCP		1.2%	0.0%	0.0%	0.0%	1	0.0%	0.0%	0.0%	0.0%		
			Cecal												0.0%
		eys	Retail Ground Turkey	0.0%	0.0%		0.0%	0.0%	0.0%			0.0%		0.0%	0.0%
		Turkeys	Cecal												
			Retail Ground Beef	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Cattle	Cecal (Beef)	1	0	0	0	0	0	0	0	0	0	0	0.0%
		S													0.0%
		_	Cecal (Dairy)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Φ	Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0
		Swine	Cecal (Market Hogs)												2.9% 1
		1	Cecal (Sows)												0.0%
Quinolones	Ciprofloxacin (MIC ≥ 4 μg/mI)	"	Retail Chickens	8.3% 1	0.0%	3.7% 1	0.0% 0	14.8% 4	4.5% 1	0.0%	0.0%	0.0%	0.0% 0	0.0% 0	0.0%
	(WIO 2 4 µg/IIII)	Chickens	HACCP		0.0%	0.0%	0.0%	0.8%	0.9%	0.0%	1.9%	0.0%	0.0%		
		S	Cecal		0	0	0	1	1	0	1	0	0		0.0%
		Turkeys	Retail Ground Turkey	0.0%	0.0%		0.0%	33.3%	100.0%			0.0%		0.0%	0.0%
			-	0	0		0	1	2			0		0	0
			Cecal	0.00/	0.0%	4.40/	0.0%	0.0%	1.8%	0.0%	0.0%	0.00/	0.0%	0.00/	0.00/
			Retail Ground Beef	0.0%	0.0%	1.1% 1	0.0%	0.0%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0
		Cattle	Cecal (Beef)												0.0%
			Cecal (Dairy)												0.0%
			Retail Pork Chops	0.0% 0	0.0%	7.1% 1	0.0% 0	12.5% 1	0.0% 0	0.0%	0.0%	0.0%	0.0% 0	0.0% 0	0.0%
		Swine	Cecal (Market Hogs)		0			-	U	0		U			0.0%
		Ó	Cecal (Sows)												0.0%
Streptogramins	Quinupristin-Dalfopristin		Retail Chickens	66.7%	82.1%	7.4%	40.0%	18.5%	40.9%	18.8%	25.0%	16.7%	5.6%	20.0%	40.0%
	(MIC ≥ 4 μg/ml)	ens		8	23 47.0%	2 32.7%	12 28.4%	5 43.7%	9 32.7%	3 28.6%	2 50.9%	4 28.6%	1 48.7%	2	6
		Chickens	HACCP		39	33	48	52	36	10	27	16	19		50.00/
			Cecal												50.0% 1
		keys	Retail Ground Turkey	50.0% 1	66.7% 2		0.0%	33.3% 1	0.0%			50.0% 1		0.0%	0.0%
		Turke	Cecal												
			Retail Ground Beef	44.7% 34	60.7% 51	10.2% 9	11.0% 9	5.2% 4	5.3% 3	4.1% 2	7.7% 2	7.3% 3	9.1% 4	12.3% 7	15.8% 6
		Cattle	Cecal (Beef)	34	31	3	3	-	,			,		É	14.6%
		O	Cecal (Dairy)												2.9%
		-	Retail Pork Chops	25.0%	35.7%	0.0%	25.0%	0.0%	0.0%	20.0%	0.0%	0.0%	50.0%	20.0%	0.0%
		ne		3	5	0	1	0	0	1	0	0	1	1	0 20.6%
		Swine	Cecal (Market Hogs)												7 25.9%
			Cecal (Sows)												7
Tetracyclines	Tetracycline (MIC ≥ 16 μg/ml)	SL	Retail Chickens	83.3% 10	64.3% 18	51.9% 14	46.7% 14	33.3% 9	81.8% 18	43.8% 7	62.5% 5	50.0% 12	72.2% 13	90.0% 9	80.0% 12
		Chickens	HACCP		62.7% 52	57.4% 58	47.3% 80	58.0% 69	55.5% 61	57.1% 20	73.6% 39	67.9% 38	64.1% 25		
		ō	Cecal												50.0% 1
		ys	Retail Ground Turkey	100.0%	0.0%		0.0%	66.7%	100.0%			50.0%		33.3%	100.0%
		Turkeys	Cecal	2	0		0	2	2			1		1	1
		Retail Ground Beef	60.5%	46.4%	53.4%	65.9%	53.2%	52.6%	53.1%	50.0%	43.9%	38.6%	66.7%	68.4%	
		te		46	39	47	54	41	30	26	13	18	17	38	26 59.2%
		Cattle	Cecal (Beef)												61 44.3%
			Cecal (Dairy)												31
			Retail Pork Chops	66.7% 8	14.3% 2	35.7% 5	50.0% 2	50.0% 4	83.3% 5	60.0% 3	100.0% 2	85.7% 6	50.0% 1	80.0% 4	100.0%
		Swine	Cecal (Market Hogs)												61.8% 21
		"	Cecal (Sows)												81.5% 22
In 2012 and 2013, chicken of	carcass rinsates were not sai	mpled	for Enterococcus												. 44

Table 105a, Resistance Patterns among Enterococcus hirae Isolates, 2002-2013

Table 105a. Resistance F	Patter	ns among <i>Enteroco</i>	ccus hira 2002	e Isolate 2003	s, 2002-2 2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested	sue	Retail Chickens	12	28	27	30	27	22	16	8	24	18	10	15
	Chickens	HACCP <sup>1</sup> Cecal		83	101	169	119	110	35	53	56	39		2
		Retail Ground Turkey	2	3	0	1	3	2	0	0	2	0	3	1
	Turkeys	Cecal												0
	Cattle	Retail Ground Beef Cecal (Beef) Cecal (Dairy)	76	84	88	82	77	57	49	26	41	44	57	38 103 70
	Swine	Retail Pork Chops Cecal (Market Hogs)	12	14	14	4	8	6	5	2	7	2	5	2 34
Resistance Pattern <sup>2</sup>	0,	Cecal (Sows) Source												27
		Retail Chickens	0.0%	0.0%	3.7%	0.0%	11.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1. No Resistance Detected	Chickens	HACCP	0	0.0%	0.0%	0.6%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0
	SPI	Cecal		0	0	1	2	0	0	0	0	0		0.0%
	· s		0.0%	0.0%		0.0%	0.0%	0.0%			50.0%		33.3%	0.0%
	Turkeys	Retail Ground Turkey	0	0		0	0	0			1		1	0
	F	Cecal	1.3%	3.6%	6.8%	0.0%	11.7%	0.0%	4.1%	7.7%	4.9%	11.4%	3.5%	2.6%
	<u>o</u>	Retail Ground Beef	1.3%	3.0%	6	0.0%	9	0.0%	2	2	2	5	2	1
	Cattle	Cecal (Beef)												2.9% 3
	L	Cecal (Dairy)												2.9% 2
		Retail Pork Chops	0.0% 0	0.0% 0	14.3% 2	0.0% 0	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0
	Swine	Cecal (Market Hogs)												8.8%
	S	Cecal (Sows)												0.0%
2. Resistance to ≥ 3		Retail Chickens	66.7%	92.9%	37.0%	50.0%	22.2%	68.2%	37.5%	37.5%	20.8%	16.7%	50.0%	53.3%
Antimicrobial Classes	Chickens	HACCP	8	26 67.5%	10 55.4%	15 47.3%	6 56.3%	15 50.0%	6 45.7%	66.0%	5 48.2%	3 59.0%	5	8
	Chic			56	56	80	67	55	16	35	27	23		50.0%
		Cecal	50.0%	66.7%		0.0%	66.7%	100.0%			50.0%		0.0%	1 0.0%
	Turkeys	Retail Ground Turkey	1	2		0.076	2	2			1		0.078	0.078
	2	Cecal												
		Retail Ground Beef	39.5% 30	36.9% 31	15.9% 14	19.5% 16	13.0% 10	17.5% 10	12.2% 6	3.9% 1	14.6% 6	15.9% 7	14.0% 8	21.1% 8
	Cattle	Cecal (Beef)												21.4% 22
		Cecal (Dairy)												2.9% 2
		Retail Pork Chops	16.7% 2	14.3% 2	14.3%	25.0% 1	12.5% 1	33.3% 2	40.0% 2	0.0%	0.0%	50.0%	20.0%	0.0%
	Swine	Cecal (Market Hogs)								U	0			17.7%
	Q	Cecal (Sows)												6 48.2%
3. Resistant to ≥ 4	<del>                                     </del>	Retail Chickens	25.0%	67.9%	14.8%	36.7%	14.8%	40.9%	6.3%	12.5%	12.5%	11.1%	30.0%	13 33.3%
Antimicrobial Classes	suex		3	19 48.2%	4 28.7%	11 25.4%	4 33.6%	9 30.0%	20.0%	1 24.5%	3 14.3%	20.5%	3	5
	Chickens	HACCP		40	29	43	40	33	7	13	8	8		0.004
		Cecal	50 ***	00 ==:		0.001	00 ==:	100 001			50.001		0.001	0.0%
	Turkeys	Retail Ground Turkey	50.0% 1	66.7% 2		0.0% 0	66.7% 2	100.0% 2			50.0% 1		0.0%	0.0%
	Ţ	Cecal												
	ø	Retail Ground Beef	14.5% 11	14.3% 12	6.8% 6	12.2% 10	3.9% 3	5.3% 3	4.1% 2	3.9% 1	7.3% 3	2.3% 1	10.5% 6	13.2% 5
	Cattle	Cecal (Beef)												12.6% 13
	L	Cecal (Dairy)												2.9%
		Retail Pork Chops	0.0%	7.1% 1	7.1% 1	25.0% 1	0.0%	16.7% 1	20.0%	0.0%	0.0%	50.0% 1	20.0% 1	0.0% 0
	Swine	Cecal (Market Hogs)												8.8%
	S	Cecal (Sows)												29.6%
4. Resistant to ≥ 5		Retail Chickens	16.7%	32.1%	0.0%	20.0%	11.1%	0.0%	0.0%	0.0%	4.2%	11.1%	0.0%	26.7%
Antimicrobial Classes	Chickens	HACCP	2	9 28.9%	11.9%	6 12.4%	3 13.4%	13.6%	2.9%	11.3%	1.8%	10.3%	0	4
	Chic	Cecal		24	12	21	16	15	1	6	1	4		0.0%
	_		50.0%	0.0%		0.0%	66.7%	0.0%			0.0%		0.0%	0.0%
	Turkeys	Retail Ground Turkey	1	0.076		0.076	2	0.076			0.076		0.078	0.078
	ı	Cecal	0.001	4.001	4.461	0.461	4.001	4.001	0.001	0.001	0.001	0.001	4.001	F 001
	ø	Retail Ground Beef	0.0%	1.2% 1	1.1% 1	2.4% 2	1.3% 1	1.8% 1	0.0%	0.0%	0.0%	0.0%	1.8% 1	5.3% 2
	Cattle	Cecal (Beef)												1.0% 1
		Cecal (Dairy)												0.0% 0
		Retail Pork Chops	0.0%	0.0%	7.1%	25.0% 1	0.0%	0.0%	20.0%	0.0%	0.0%	50.0%	0.0%	0.0%
	Swine	Cecal (Market Hogs)	U	0	1		U			U	0		U	2.9%
	Ś	Cecal (Sows)												11.1%
1 la 2012 and 2012 abidea and	0000 r	insates were not sampled	for Enteroc	OCCUS										3

<sup>&</sup>lt;sup>1</sup> In 2012 and 2013, chicken carcass finsates were not sampled for *Enterococcus*<sup>2</sup> Resistance patterns do not include daptomycin as there are no established CLSI breakpoints

Table 105b. Resistance Patter Year	iio ail	iong Emerococcus nirae	2002	2002-2013	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of Isolates Tested	Chickens	Retail Chickens HACCP <sup>1</sup>	12	28 83	27 101	30 169	27 119	22 110	16 35	8 53	24 56	18	10	15
	Turkeys	Cecal  Retail Ground Turkey	2	3	0	1	3	2	0	0	2	0	3	2
	Cattle Tur	Cecal  Retail Ground Beef Cecal (Beef)	76	84	88	82	77	57	49	26	41	44	57	0 38 103
		Cecal (Dairy)  Retail Pork Chops	12	14	14	4	8	6	5	2	7	2	5	70 2
	Swine	Cecal (Market Hogs) Cecal (Sows)												34 27
Resistance Pattern <sup>2</sup> 4. Resistant to ≥ 6		Source	8.3%	0.0%	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	4.2%	0.0%	0.0%	6.7%
Antimicrobial Classes	Chickens	Retail Chickens HACCP	1	0 2.4%	0 3.0%	3 1.8%	0	0 2.7%	0.0%	3.8%	0.0%	0 2.6%	0	1
	Ş	Cecal		2	3	3	1	3	0	2	0	1		0.0%
			0.0%	0.0%		0.0%	33.3%	0.0%			0.0%		0.0%	0.0%
	Turkeys	Retail Ground Turkey	0	0		0	1	0			0		0	0
	Ĕ	Cecal	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	<u>e</u>	Retail Ground Beef	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	Cecal (Beef)												0
		Cecal (Dairy)			2.001			2.224	2.22		2.22			0.0%
	m	Retail Pork Chops	0.0% 0	0.0% 0	0.0%	25.0% 1	0.0% 0	0.0% 0	0.0% 0	0.0%	0.0% 0	0.0% 0	0.0% 0	0.0%
	Swine	Cecal (Market Hogs)												2.9% 1
		Cecal (Sows)												3.7% 1
6. At Least Pencillin G and High Level Gentamicin	SI	Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	4.6% 1	0.0%	0.0%	0.0%	0.0%	0.0%	6.7% 1
	Chickens	HACCP		3.6% 3	1.0%	1.2% 2	0.8% 1	0.9% 1	0.0%	0.0%	1.8% 1	2.6%		
	ò	Cecal							-					0.0% 0
	ske	Retail Ground Turkey	0.0% 0	0.0%		0.0%	33.3% 1	0.0%			0.0%		0.0%	0.0%
	Turkeys	Cecal	J	Ů										
		Retail Ground Beef	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	Cecal (Beef)	0	0	0	0	0	0	0	0	0	0	0	0.0%
	0	Cecal (Dairy)												0.0%
		Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Swine	Cecal (Market Hogs)	0	0	0	0	0	0	0	0	0	0	0	0.0%
	Ś	Cecal (Sows)												0.0%
7. At Least Pencillin G		Retail Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
High Level Gentamicin, and Linezolid Resistant	Chickens	HACCP	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0
	Chic			0	0	0	0	0	0	0	0	0		0.0%
		Cecal	0.0%	0.0%		0.0%	0.0%	0.0%			0.0%		0.0%	0.0%
	Turkeys	Retail Ground Turkey	0	0		0	0	0			0		0	0
	Ĕ	Cecal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	ā	Retail Ground Beef	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	Cecal (Beef)												0.0%
		Cecal (Dairy)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Ф	Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0
	Swine	Cecal (Market Hogs)												0.0%
		Cecal (Sows)												0.0%
8. At Least Pencillin G, High Level Gentamicin,	SL	Retail Chickens	0.0% 0	0.0%	0.0%	0.0% 0	0.0%	0.0%	0.0%	0.0%	0.0% 0	0.0% 0	0.0%	0.0%
and Tigecycline Resistant	Chickens	HACCP		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
	ਹ	Cecal												0.0%
	eys	Retail Ground Turkey	0.0%	0.0%		0.0%	0.0%	0.0%			0.0%		0.0%	0.0%
	Turkeys	Cecal				Ť								
		Retail Ground Beef	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Cattle	Cecal (Beef)	3	0	0		0	0		U			U	0.0%
	٥	Cecal (Dairy)												0.0%
		Retail Pork Chops	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Swine	Cecal (Market Hogs)	0	0	0	0	0	0	0	0	0	0	0	0.0%
	Ś	Cecal (Sows)												0.0%
														0

Cecal (Sows)

<sup>1</sup> In 2012 and 2013, chicken carcass rinsates were not sampled for *Enterococcus*<sup>2</sup> Resistance patterns do not include daptomycin as there are no established CLSI breakpoints

# Appendix A

Table A1. Concentration Ranges Used for Susceptibility Testing of *Salmonella* and *E. coli*, 2012-2013

Antimicrobial Class	Antimicrobial Agent	Concentration Range (μg/ml)
Aminoglycosides	Gentamicin	0.25 - 16
	Kanamycin <sup>1</sup>	8 - 64
	Streptomycin <sup>2</sup>	32 - 64
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin-Clavulanic Acid	1 / 0.5 - 32 / 16
Cephems	Cefoxitin	0.5 - 32
	Ceftiofur	0.12 - 8
	Ceftriaxone	0.25 - 64
Folate Pathway Inhibitors	Sulfisoxazole	16 - 256
	Trimethoprim–Sulfamethoxazole	0.12 / 2.4 - 4 / 76
Macrolides	Azithromycin	0.12 - 16
Penicillins	Ampicillin	1 - 32
Phenicols	Chloramphenicol	2 - 32
Quinolones	Ciprofloxacin	0.015 - 4
	Nalidixic acid	0.5 - 32
Tetracyclines	Tetracycline	4 - 32

Table A2. Concentration Ranges Used for Susceptibility Testing of Campylobacter, 2012-2013

Antimicrobial Class	Antimicrobial Agent	Concentration Range (μg/ml)
Aminoglycosides	Gentamicin	0.12 - 32
Ketolides	Telithromycin	0.015 - 8
Lincosamides	Clindamycin	0.03 - 16
Macrolides	Azithromycin	0.015 - 64
	Erythromycin	0.03 - 64
Phenicols	Florfenicol	0.03 - 64
Quinolones	Ciprofloxacin	0.015 - 64
	Nalidixic acid	4 - 64
Tetracyclines	Tetracycline	0.06 - 64

Table A3. Concentration Ranges Used for Antimicrobial Susceptibility Testing of Salmonella and E. coli Resistant to Ceftriaxone or Ceftiofur, 2011-2013

Antimicrobial Class	Antimicrobial Agent	Concentration Range (µg/ml)
β-Lactam/β-Lactamase Inhibitor Combinations	Piperacillin-tazobactam	0.5 - 128
Cephems	Cefepime	0.125 - 32
	Cefotaxime	0.125 - 128
	Ceftazidime	0.125 - 128
Monobactams	Aztreonam	0.125 - 32
Penems	Imipenem	0.125 - 16

Table A4. Concentration Ranges Used for Susceptibility Testing of *Enterococcus*, 2012-2013

Antimicrobial Class	Antimicrobial Agent	Concentration Range (μg/ml)
Aminoglycosides	Gentamicin	128 - 1024
	Kanamycin	128 - 1024
	Streptomycin	512 - 2048
Glycopeptides	Vancomycin	0.25 - 32
Glycylcyclines	Tigecycline	0.015 - 0.5
Lincosamides	Lincomycin	1 - 8
Lipopeptides	Daptomycin	0.25 - 16
Macrolides	Erythromycin	0.25 - 8
	Tylosin	0.25 - 32
Nitrofurans	Nitrofurantoin	2 - 64
Oxazolidinones	Linezolid	0.5 - 8
Penicillins	Penicillin	0.25 - 16
Phenicols	Chloramphenicol	2 - 32
Quinolones	Ciprofloxacin	0.12 - 4
Streptogramins	Quinupristin-Dalfopristin	0.5 - 32
Tetracyclines	Tetracycline	1 - 32

#### Appendix B

Table B1. Antimicrobial Agents and Antimicrobial Susceptibility Testing Methods for Salmonella and E. coli Isolates, 1996-2013<sup>1,2</sup>

	crobial Agents and A		<u></u>	penamey						Broth Micr									
	Sensititre® Plate Name	CMV1CCDC <sup>3</sup> CMV3CNCD	CMV3	CNCD	CMV4CNCD	CMV5CNCD	CMV6CNCD	CMV7	CNCD				CMV1AGNF					CMV2AGNF	
	Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Antimicrobial Class	Antimicrobial Agent																		
Aminocyclitols	Apramycin	√	√	<b>V</b>	√	√	<b>V</b>												
Aminoglycosides	Amikacin	√	4	<b>V</b>	<b>V</b>	1	<b>V</b>	<b>V</b>	<b>V</b>	<b>V</b>	√	√	√	<b>V</b>	<b>V</b>	<b>V</b>			
	Gentamicin	√	√	√	√	4	√	√	√	√	√	√	√	4	√	<b>V</b>	√	√	√
	Kanamycin	√	√	√	√	4	√	√	√	√	√	√	√	4	√	<b>V</b>	√	√	√
	Streptomycin	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin-Clavulanic Acid	√	<b>V</b>	<b>V</b>	<b>V</b>	<b>V</b>	V	V	√	√	√	√	√	4	1	<b>V</b>	√	<b>V</b>	<b>V</b>
Cephems	Cefoxitin					4	√	√	√	√	√	√	√	<b>V</b>	√	√	√	√	√
	Ceftiofur	√	√	<b>V</b>	√	<b>V</b>	<b>V</b>	√	√	√	√	√	√	<b>V</b>	√	√	√	√	√
	Ceftriaxone	4	√	√	√	4	√	<b>V</b>	√	√	√	√	√	√	√	<b>V</b>	√	√	√
	Cephalothin	√	√	√	√	√	√	√	√										
Coumarins	Novobiocin	√																	
Folate Pathway Inhibitors	Sulfamethoxazole	√	√	√	√	√	√	<b>V</b>	√										
	Sulfisoxazole									√	√	√	√	√	√	√	√	√	√
	Trimethoprim-Sulfamethoxazole	√	√	√	√	√	√	1	√	√	√	√	√	√	√	√	√	√	√
Macrolides	Azithromycin																√	√	√
Penems	Imipenem						√												
Penicillins	Ampicillin	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Ticarcillin	√	<b>V</b>	√															
Phenicols	Chloramphenicol	√	√	4	√	√	√	1	√	√	√	√	√	4	√	√	√	√	√
	Florfenicol				√														
Quinolones	Ciprofloxacin	√	√	4	√	√	√	1	√	√	√	√	√	4	√	√	√	√	√
	Nalidixic acid	√	√	4	√	√	√	1	√	√	√	√	√	4	√	√	√	√	√
Tetracyclines	Tetracycline	√	√	<b>V</b>	<b>V</b>	√	√	√	√	√	4	√	√	<b>V</b>	√	√	√	√	√

<sup>&</sup>lt;sup>1</sup> Testing of Salmonella isolates from humans, food animals, and retail meats began in 1996, 1997, and 2002, respectively

<sup>&</sup>lt;sup>2</sup> Testing of *E. coli* isolates from chickens and retail meats began in 2000 and 2002, respectively. Testing of *E. coli* 157 isolates from humans began in 1996 and a study of *E. coli* isolates from people in the community began in 2004 <sup>3</sup> In 1996, most isolates were tested using Sensititre® plate CMV1CCDC, but a few isolates were tested using Sensititre® plate CMV3CNCD

Table B2. Antimicrobial Agents and Antimicrobial Susceptibility Testing Methods for Campylobacter Isolates from Humans and Chickens, 1997-20131

	Method				E-	Γest <sup>®</sup>								oth Microdilution				
	Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Antimicrobial Class	Antimicrobial Agent																	
Aminoglycosides	Gentamicin		√	√	√	√	√	√	√	4	4	√	√	√	√	4	4	√
Ketolides	Telithromycin									√	4	√	√	√	√	√	<b>V</b>	√
Lincosamides	Clindamycin	√	√	√	√	√	√	√	√	√	4	√	√	√	√	√	4	√
Macrolides	Azithromycin		√	√	√	√	√	√	√	√	4	√	√	√	√	4	4	√
	Erythromycin	√	√	√	√	√	√	<b>V</b>	√	4	4	√	√	√	√	4	4	√
Penems	Meropenem																	
Phenicols	Chloramphenicol	√	√	√	√	√	√	<b>V</b>	√									
	Florfenicol									4	4	√	√	√	√	4	4	√
Quinolones	Ciprofloxacin	√	√	√	√	√	√	<b>V</b>	√	4	4	√	√	√	√	4	4	√
	Nalidixic acid	√	√	√	<b>V</b>	√	√	<b>V</b>	√	4	4	√	√	√	√	4	4	√
Tetracyclines	Doxycycline																	
	Tetracycline	√	√	√	√	<b>V</b>	√	<b>V</b>	√	4	√	√	√	<b>V</b>	<b>V</b>	4	1	<b>V</b>

<sup>&</sup>lt;sup>1</sup>Testing of *Campylobacter* isolates from humans and chickens began in 1997 and 1998, respectively

Table B3. Antimicrobial Agents and Antimicrobial Susceptibility Testing Methods for Campylobacter Isolates from Retail Meats, 2002-2013

	Method				Agar I	Dilution					Broth Micr Sensititre® Pla					
	Year				2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Antimicrobial Class	Antimicrobial Agent															
Aminoglycosides	Gentamicin				√	√	√	√	√	√	√	√	√	√	√	√
Ketolides	Telithromycin						√	√	1	√	√	√	√	√	√	√
Lincosamides	Clindamycin						√	4	√	√	√	√	√	√	√	√
Macrolides	Azithromycin						√	4	4	√	√	√	√	4	√	<b>V</b>
	Erythromycin				√	√	√	4	√	√	√	√	√	√	4	√
Penems	Meropenem				√	√										
Phenicols	Chloramphenicol															
	Florfenicol						√	4	√	√	√	√	√	√	√	√
Quinolones	Ciprofloxacin				√	√	√	4	4	√	√	√	√	4	4	<b>V</b>
	Nalidixic acid					-	√	4	√	√	√	√	√	<b>V</b>	4	√
Tetracyclines	Doxycycline				<b>V</b>	<b>√</b>										
	Tetracycline						√	√	4	√	√	√	√	√	√	√

Table B4. Antimicrobial Agents and Antimicrobial Susceptibility Testing Methods for Enterococcus Isolates, 2001-2013

	Method	Turnicrobial Susceptibility Testing Methods I			·	Broth Mic			
	Sensititre® Plate Name		CMV4ACDC <sup>2</sup> CMV5ACDC	CMV5	ACDC	CMV1AGPF	CMV1AGPF <sup>3</sup> CMV2AGPF	CMV2AGPF	CMV3AGPF
	Year		2001	2002	- 2003	2004	2005	2006 - 2008	2009 - 2013
Antimicrobial Class	Antimicrobial Agent							Concentration Range ( µg/ml)	
Aminoglycosides	Gentamicin		√	√	√	√	√	√	√
	Kanamycin		√	√	√	√	√	√	√
	Streptomycin		√	√	√	√	√	√	√
Glycopeptides	Vancomycin		√	√	√	√	√	√	√
Glycylcyclines	Tigecycline						<b>V</b>	√	√
Ionophores	Salinomycin		√		l				
Lincosamides	Lincomycin		√		V	√	√	√	√
Lipopeptides	Daptomycin					√	<b>V</b>	√	√
Macrolides	Erythromycin		√	4	V	√	<b>V</b>	√	√
	Tylosin		√	-	V	√	√	√	√
Nitrofurans	Nitrofurantoin		<u>-</u>		V	4	√	1	√
Oxazolidinones	Linezolid		7	-	l	√	√	√	V
Penicillins	Penicillin		√	-	V	√	√	√	V
Phenicols	Chloramphenicol		√		V	4	√	1	√
Phosphoglycolipids	Flavomycin		√	-	V	√	√	$\sqrt{4}$	
Polypeptides	Bacitracin		√		V	√	√		
Quinolones	Ciprofloxacin		√		V	√	√	1	√
Streptogramins	Quinupristin-Dalfopristin		√		V	4	√	1	√
	Virginiamycin		√	_					
Tetracyclines	Tetracycline		√		V	√	√	1	√

<sup>&</sup>lt;sup>1</sup> Testing of Enterococcus isolates from retail meats and chickens began in 2002 and 2003, respectively. A study of Enterococcus isolates from people in the community began in 2001

<sup>&</sup>lt;sup>2</sup> In 2001, most isolates were tested using Sensititre® plate CMV5ACDC, but a few isolates were tested using Sensititre® plate CMV4ACDC

<sup>&</sup>lt;sup>3</sup> In 2005, isolates from chickens and most isolates from humans were tested with Sensititre<sup>®</sup> plate CMV1AGPF, while isolates from retail meats were tested with Sensititre<sup>®</sup> plate CMV2AGPF

 $<sup>^{\</sup>rm 4}$  Flavomycin was not available for all of the plates used to test isolates from 2008

Table B5. Antimicrobial Agents and Antimicrobial Susceptibility Testing Methods for Salmonella and E. coli Resistant to Ceftriaxone or Ceftiofur, 2011-2013

								-													
	Method										Brot	Broth Microdilution									
	Sensititre® Plate Name											CMV2DW									
	Year										2011	2012	2013								
Antimicrobial Class	Antimicrobial Agent																				
β-Lactam/β-Lactamase Inhibitor Combinations	Piperacillin-tazobactam										√	<b>V</b>	√								
Cephems	Cefepime										√	<b>V</b>	√								
	Cefotaxime										√	√	√								
	Ceftazidime										√	<b>V</b>	√								
Monabactams	Aztreonam			-							√	1	√								
Penems	Imipenem										√	√	√								