National Antimicrobial Resistance Monitoring System: Enteric Bacteria

NARMS

2005

Veterinary Isolates Final Report

Bacterial Epidemiology and Antimicrobial Resistance

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I. Introduction

In an effort to prospectively monitor the occurrence of antimicrobial resistance of zoonotic pathogens from human diagnostic specimens, retail meats and food animals, the National Antimicrobial Resistance Monitoring System (NARMS) was established in 1996 by the Food and Drug Administration's Center for Veterinary Medicine in collaboration with the Center for Disease Control and Prevention (CDC), and the United States Department of Agriculture (USDA).

The animal component of NARMS is housed within the Bacterial Epidemiology and Antimicrobial Resistance Research Unit (BEAR) of the Agricultural Research Service (ARS) in Athens, Georgia. The animal component of NARMS comprises the testing of isolates obtained from diagnostic animal specimens, healthy on-farm animals, and food-producing animals at slaughter. The panel of antimicrobial agents chosen is representative of common antimicrobials used in both human and veterinary medicine. Non-typhoid *Salmonella* was chosen as a sentinel organism of the animal component of NARMS which was launched in 1997. Testing of *Campylobacter* isolates began in 1998 while *Escherichia coli* and *Enterococcus* were included in 2000.

This report summarizes 2005 data for *Salmonella*, *Campylobacter*, *E.coli*, and *Enterococcus* isolates from food-producing animals at slaughter (carcass rinsates, carcass swabs, and ground products) obtained through USDA's Food Safety and Inspection Service (FSIS) Pathogen Reduction: Hazard Analysis and Critical Control Point (PR/HACCP) verification testing program. When suitable, resistance trends are also included; however, due to the amount of data and complexity of analyses involved, all permutations are not represented. Additional information on the animal component of NARMS including past annual reports, summary trend tables and graphs can be found on the web at
http://www.ars.usda.gov/Main/docs.htm?docid=14491.

The 2003 NARMS Executive Report also contains additional background information on sampling and testing methodology as well as summary data from all three components of the program and is available on the web at
http://www.fda.gov/cvm/Documents/NARMSExecSum03.pdf

II. Sampling and Testing Methods

A. Samples

Salmonella isolates were recovered from food animals at slaughter: carcass rinsates (chicken), carcass swabs (turkey, cattle and swine), and ground products (chicken, turkey, and beef) collected through USDA-FSIS's *Salmonella* PR/HACCP verification testing program from all federally inspected plants throughout the United States. Recovery of *Campylobacter*, *E. coli*, and *Enterococcus* was only attempted from chicken carcass rinsates. For this report, descriptions of isolates are confined by major animal species.

B. Isolation

Salmonella isolation from slaughter samples was conducted at all three FSIS Regulatory Field Services Laboratories (Eastern, Midwestern and Western) following the Isolation and Identification of *Salmonella* from Meat, Poultry, and Egg procedures as described in the Microbiology Laboratory Guidebook, section 4.[1] Positive isolates were forwarded by FSIS to the National Veterinary Services Laboratories (NVSL) for serotyping and were subsequently sent to the BEAR unit as serotyping results became available.

From 1998 to 2000, *Campylobacter* was isolated by FSIS using the method described in the FSIS Microbiology Laboratory Guidebook[2]. For the first half of 2001, ARS tested several isolation methods until a new method was adopted in July. Since that time, *Campylobacter* has been isolated by ARS from FSIS' Eastern lab spent chicken carcass rinsates. ARS started isolating *E.coli* and *Enterococcus* from these same rinsates in 2000 and 2003, respectively. Previous years annual report and summary tables are available on the web at:
http://www.ars.usda.gov/Main/docs.htm?docid=14491. Additionally, *Enterococcus* and *Campylobacter* speciation was also performed as described below.

C. *Enterococcus* Speciation

A species-specific multiplex PCR was performed on presumptive *Enterococcus* isolates which provided a simultaneous genus and species identification of 23 species of enterococci.[3] Confirmed *Enterococcus* isolates of other species not identified with this procedure were labeled as '*Enterococcus* species'.

D. *Campylobacter* Speciation

Final confirmation and speciation were obtained using the *Campylobacter* BAX® PCR (DuPont Qualicon; Wilmington, DE). This multiplex assay, specific for *C. coli* and *C. jejuni*, was performed according to manufacturer's directions as previously described[4].

E. Antimicrobial Susceptibility

Salmonella, *Campylobacter*, *E.coli*, and *Enterococcus* were tested using a semi-automated system (Sensitire®, Trek Diagnostic Systems, Westlake, Ohio). Resistance trends for *Campylobacte*r include data from 1998-2004 which was obtained using Etest® (AB Biodisk). Antimicrobial resistance was determined using Clinical and Laboratory Standards Institute (CLSI, formerly NCCLS) standards, when available.[5,6] For antimicrobial agents without CLSI approved standards, NARMS interpretive criteria as established by the NARMS working group were used. Tables 1, 2 and 3 list antimicrobials tested and their breakpoints for *Salmonella/E.coli*, *Campylobacter*, and *Enterococcus* respectively.

Quality control strains used for *Salmonella* and *E.coli* included *E.coli* ATCC 25922, *Enterococcus faecalis* ATCC 29212, and *Staphylococcus aureus* ATCC 29213. *Campylobacter jejuni* ATCC 33560 was used for *Campylobacter* testing while four strains were used for testing *Enterococcus*: *Enterococcus faecalis* ATCC 29212, *Enterococcus faecalis* ATCC 51299, *E.coli* ATCC 25922, and *Staphylococcus aureus* ATCC 29213.

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References

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[2] USDA/FSIS. 1998. Isolation, Identification, And Enumeration Of *Campylobacter jejuni/coli* From Meat And Poultry Products. Microbiology Laboratory Guidebook, chapter 6. Available at http://www.fsis.usda.gov/ophs/Microlab/Mlgchp6.pdf

[3] Jackson, C. 2004. Use of a Genus- and Species-Specific Multiplex PCR for Identification of *Enterococci*. Journal of Clinical Microbiology, *42*(8):3558-65.

[4] Englen, M.D. and Paula J. Fedorka-Cray. 2002. Evaluation of a Commercial Diagnostic PCR for the Identification of *Campylobacter jejuni* and *Campylobacter coli*. Lett. Appl. Microbiol, 35:353-356.

[5] NCCLS/CLSI. 2002. Performance Standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated from Animals. Approved Standard, M31-A2. NCCLS, Wayne, PA.

[6] CLSI. 2006. Performance Standards for Antimicrobial Susceptibility Testing; Sixteenth Informational Supplement (M100-S16). CLSI, Wayne, PA.

Table 1. Breakpoints Used for Susceptibility Testing of *Salmonella* and *E.coli* [1]

CLSI Subclass[2]	Antimicrobial Agent	Breakpoints (µg/ml)		
		Susceptible	Intermediate	Resistant
Aminoglycosides	Amikacin	≤ 16	32	≥ 64
	Gentamicin	≤ 4	8	≥ 16
	Kanamycin	≤ 16	32	≥ 64
	Streptomycin[3]	≤ 32	N/A	≥ 64
Aminopenicillins	Ampicillin	≤ 8	16	≥ 32
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin–Clavulanic Acid	≤ 8 / 4	16/8	≥ 32 / 16
Cephalosporins I	Cephalothin	≤ 8	16	≥ 32
Cephalosporins III	Ceftiofur	≤ 2	4	≥ 8
	Ceftriaxone	≤ 8	16 - 32	≥ 64
Cephamycins	Cefoxitin	≤ 8	16	≥ 32
Folate Pathway Inhibitors	Sulfanomides	≤ 256	N/A	≥ 512
	Trimethoprim–Sulfamethoxazole	≤ 2 / 38	N/A	≥ 4 / 76
Phenicols	Chloramphenicol	≤ 8	16	≥ 32
Fluoroquinolones	Ciprofloxacin	≤ 1	2	≥ 4
Quinolones	Nalidixic acid	≤ 16	N/A	≥ 32
Tetracyclines	Tetracycline	≤ 4	8	≥ 16

[1] Breakpoints established by CLSI (Clinical and Laboratory Standards Institute) were used when available
[2] According to CLSI M100 document
[3] There are no CLSI breakpoints for streptomycin

Table 2. Breakpoints Used for Susceptibility Testing of *Campylobacter*[1]

CLSI Subclass[2]	Antimicrobial Agent	Breakpoints (µg/ml) Microbroth Dilution (2005)			Breakpoints (µg/ml) Etest (1998-2004)		
		Susceptible	Intermediate	Resistant	Susceptible	Intermediate	Resistant
Aminoglycosides	Gentamicin	≤ 2	4	≥ 8	≤ 4	8	≥ 16
Lincosamides	Clindamycin	≤ 2	4	≥ 8	≤ 0.5	1 - 2	≥ 4
Macrolides	Azithromycin	≤ 2	4	≥ 8	≤ 0.25	0.5 - 1	≥ 2
	Erythromycin	≤ 8	16	≥ 32	≤ 0.5	1 - 4	≥ 8
Ketolides	Telithromycin	≤ 4	8	≥ 16	NT	NT	NT
Phenicols	Florfenicol	≤ 4	N/A	N/A	NT	NT	NT
	Chloramphenicol	NT	NT	NT	≤ 8	16	≥ 32
Fluoroquinolones	Ciprofloxacin	≤ 1	2	≥ 4	≤ 1	2	≥ 4
Quinolones	Nalidixic acid	≤ 16	32	≥ 64	≤ 16	N/A	≥ 32
Tetracyclines	Tetracycline	≤ 4	8	≥ 16	≤ 4	8	≥ 16

[1] Breakpoints established by CLSI (Clinical and Laboratory Standards Institute) were used when available. CLSI breakpoints are available only for erythromycin, ciprofloxacin, and tetracycline

[2] According to CLSI M100 document

N/A - Not applicable

NT- Not tested

Table 3. Breakpoints Used for Susceptibility Testing of *Enterococcus*[1]

CLSI Subclass[2]	Antimicrobial Agent	Breakpoints (µg/ml)		
		Susceptible	Intermediate	Resistant
Aminoglycosides[3]	Gentamicin	≤ 500	N/A	> 500
	Kanamycin	≤ 512	N/A	≥ 1024
	Streptomycin	≤ 1000	N/A	> 1000
Glycopeptides	Vancomycin	≤ 4	8 - 16	≥ 32
Glycylcyclines	Tigecycline	≤ 0.25	N/A	N/A[4]
Lincosamides	Lincomycin	≤ 2	4	≥ 8
Lipopeptides	Daptomycin	≤ 4	N/A	N/A[5]
Macrolides	Erythromycin	≤ 0.5	1 - 4	≥ 8
	Tylosin	≤ 8	16	≥ 32
Nitrofurans	Nitrofurantoin	≤ 32	64	≥ 128
Oxazolidinones	Linezolid	≤ 2	4	≥ 8
Penicillins	Penicillin	≤ 8	N/A	≥ 16
Phenicols	Chloramphenicol	≤ 8	16	≥ 32
Phosphoglycolipid	Flavomycin	≤ 8	16	≥ 32
Polypeptides	Bacitracin	≤ 16	32	≥ 64
Quinolones	Ciprofloxacin	≤ 1	2	≥ 4
Streptogramins	Quinupristin-Dalfopristin	≤ 1	2	≥ 4
Tetracyclines	Tetracycline	≤ 4	8	≥ 16

Notes:

[1] Breakpoints were adopted from CLSI (Clinical and Laboratory Standards Institute), when available

[2] According to CLSI M100 document

[3] For the aminoglycosides, breakpoints refer to high-level aminoglycoside resistance

[4] For tigecycline, only a susceptible breakpoint (≤ 0.25 µg/ml) has been established. In this report, isolates with an MIC ≥ 0.5 µg/ml are categorized as resistant [2005 Report]

[5] For daptomycin, only a susceptible breakpoint (≤ 4 µg/ml) has been established. In this report, isolates with an MIC ≥ 8 µg/ml are categorized as resistant

Isolates Tested

Table 1. Total Number of Isolates Tested by Organism and Source, 2005

Animal Source	Species			
	Salmonella	*Campylobacter*	*E.coli*	*Enterococcus*
Chickens	1989	947	2232	1497
Turkeys	227	N/A	N/A	N/A
Cattle	329	N/A	N/A	N/A
Swine	301	N/A	N/A	N/A

Table 2. Isolation from Carcass Rinsates, 2005

Animal Source	Species		
	Campylobacter	*E.coli*	*Enterococcus*
Number of Carcass Rinsates Tested	3757	3735	3706
Number Positive[1]	947	2333	3099
Percent Positive	25.2%	62.5%	83.6%

[1]Not all positive isolates were tested for antimicrobial susceptibility

Salmonella

Table 1. Total Number of *Salmonella* Isolates Tested from Food Animals, 1997-2005

Animal Source	Year								
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Chickens	214	561	1438	1173	1307	1500	1158	1280	1989
Turkeys	107	240	713	518	550	244	262	236	227
Cattle	24	284	1610	1388	893	1008	670	607	329
Swine	111	793	876	451	418	379	211	308	301

Table 2. Most Common Serotypes among *Salmonella* Isolates from Food Animals, 2005

Animal Source	Rank	Serotype	n	%
Chickens (n=1989)	1	Kentucky	919	46.2
	2	Heidelberg	283	14.2
	3	Enteritidis	173	8.7
	4	I 4,[5],12:i:-	102	5.1
	5	Typhimurium var. 5-	100	5.0
	6	Typhimurium	83	4.2
	7	Montevideo	62	3.1
	8	Schwarzengrund	51	2.6
	9	Thompson	23	1.2
	10	Mbandaka	20	1.0
Subtotal			1816	91.3
		Others	173	8.7
Total			1989	100.0

Animal Source	Rank	Serotype	n	%
Turkey (n=227)	1	Hadar	48	21.1
	2	Saintpaul	29	12.8
	3	Heidelberg	24	10.6
	4	Reading	19	8.4
	5	Schwarzengrund	14	6.2
	6	IIIa 18:z4,z23:-	11	4.8
	7	Senftenberg	8	3.5
	8	Agona	7	3.1
	9	Albany	6	2.6
	10	Muenchen	5	2.2
	10	Kentucky	5	2.2
	10	Newport	5	2.2
	10	Typhimurium	5	2.2
Subtotal			186	81.9
		Others	41	18.1
Total			227	100.0

Animal Source	Rank	Serotype	n	%
Cattle (n=329)	1	Montevideo	43	13.1
	2	Newport	27	8.2
	3	Muenster	24	7.3
	4	Anatum	21	6.4
	5	Typhimurium var. 5-	17	5.2
	5	Typhimurium	17	5.2
	6	Mbandaka	15	4.6
	6	Agona	15	4.6
	7	Dublin	13	4.0
	8	Cerro	12	3.6
	8	Reading	12	3.6
	9	Meleagridis	9	2.7
	10	Kentucky	9	2.7
Subtotal			234	71.1
		Others	95	28.9
Total			329	100.0

Animal Source	Rank	Serotype	n	%
Swine (n=301)	1	Derby	85	28.2
	2	Typhimurium var. 5-	36	12.0
	3	Infantis	27	9.0
	4	Anatum	16	5.3
	5	Johannesburg	15	5.0
	6	Saintpaul	11	3.7
	6	Reading	11	3.7
	6	London	11	3.7
	7	Adelaide	10	3.3
	8	Heidelberg	8	2.7
	9	Agona	7	2.3
	10	Hadar	6	2.0
	10	Typhimurium	6	2.0
	10	Manhattan	6	2.0
Subtotal			255	84.7
		Others	46	15.3
Total			301	100.0

Figure 1. Chickens Serotype Percent Distribution by Year in Relation to Top Serotypes Identified in 2005

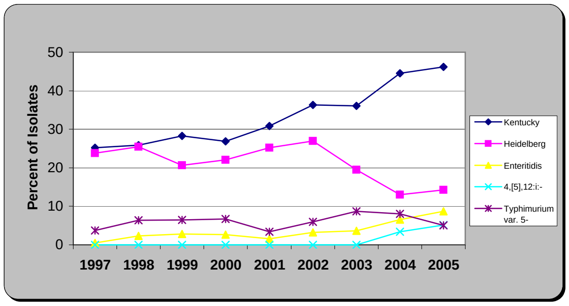

Figure 2. Cattle Serotype Percent Distribution by Year in Relation to Top Serotypes Identified in 2005

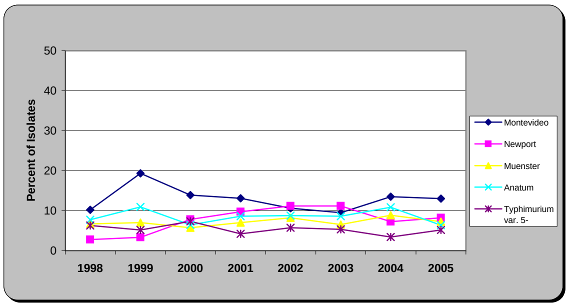

Figure 3. Turkey Serotype Percent Distribution by Year in Relation to Top Serotypes Identified in 2005

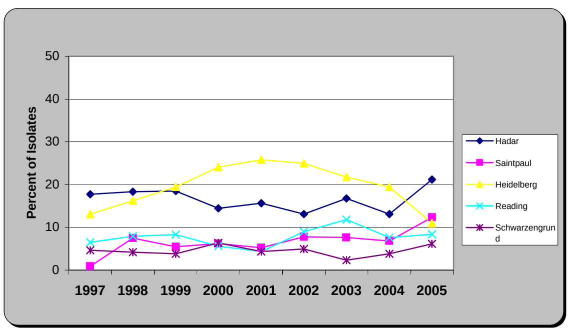

Figure 4. Swine Serotype Percent Distribution by Year in Relation to Top Serotypes Identified in 2005

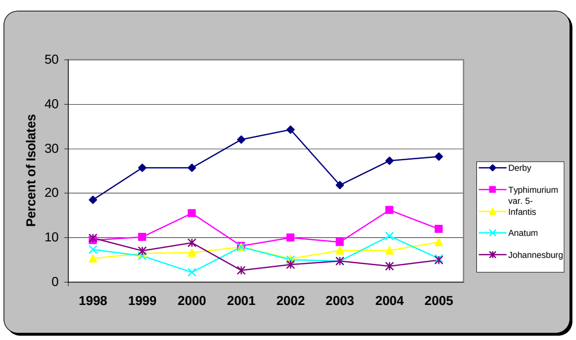

Table 3a. Distribution of MICs and Occurrence of Resistance by Animal Source among all *Salmonella* Isolates from Food Animals, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	95% CI[3]	Distribution (%) of MICs (µg/ml)[4] 0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Aminoglycosides																					
Amikacin	Chickens (1989)	0.0	**0.0**	0.0-0.2						20.8	63.2	14.2	1.7								
	Turkeys (227)	0.0	**0.0**	0.0-2.1						13.2	68.7	15.9	1.8	0.4							
	Cattle (329)	0.0	**0.0**	0.0-1.4						12.8	61.1	23.1	2.1	0.9							
	Swine (301)	0.0	**0.0**	0.0-1.6						14.0	68.1	16.3	1.7								
Gentamicin	Chickens (1989)	0.4	**4.3**	3.5-5.3					71.3	23.1	0.8	0.1	0.2	0.4	**2.7**	**1.6**					
	Turkeys (227)	4.0	**22.9**	17.7-29.0					48.5	22.9	0.9	0.4	0.4	4.0	**16.7**	**6.2**					
	Cattle (329)	0.3	**2.4**	1.1-4.9					60.8	34.3	1.2	0.6	0.3	0.3	**0.6**	**1.8**					
	Swine (301)	0.0	**2.7**	1.3-5.4					67.8	27.2	2.0		0.3		**2.3**	**0.3**					
Kanamycin	Chickens (1989)	0.0	**2.5**	1.9-3.3										97.2	0.3		**0.5**	**2.0**			
	Turkeys (227)	0.0	**19.8**	14.9-25.7										80.2			**2.2**	**17.6**			
	Cattle (329)	0.0	**13.1**	9.7-17.3										86.0	0.9		**0.6**	**12.5**			
	Swine (301)	0.0	**5.0**	2.9-8.3										95.0				**5.0**			
Streptomycin	Chickens (1989)	0.0	**23.3**	21.5-25.2												76.7	**17.7**	**5.6**			
	Turkeys (227)	0.0	**40.1**	33.7-46.8												59.9	**25.6**	**14.5**			
	Cattle (329)	0.0	**24.3**	19.8-29.4												75.7	**2.1**	**22.2**			
	Swine (301)	0.0	**36.5**	31.1-42.2												63.5	**11.6**	**24.9**			
Aminopenicillins																					
Ampicillin	Chickens (1989)	0.2	**14.0**	12.5-15.6							69.0	16.2	0.4	0.2	0.2	**0.1**	**13.9**				
	Turkeys (227)	0.0	**22.9**	17.7-29.0							62.6	13.2	0.9	0.4			**22.9**				
	Cattle (329)	0.0	**26.7**	22.1-31.9							60.8	11.6	0.9				**26.7**				
	Swine (301)	0.0	**13.6**	10.0-18.1							69.4	16.6	0.3				**13.6**				
β-Lactam/β-Lactamase Inhibitor Combinations																					
Amoxicillin-Clavulanic Acid	Chickens (1989)	1.2	**12.1**	10.7-13.6							83.2	2.5	0.3	0.8	1.2	**0.3**	**11.8**				
	Turkeys (227)	12.3	**3.5**	1.6-7.1							70.5	6.6		7.0	12.3		**3.5**				
	Cattle (329)	1.8	**21.0**	16.8-25.9							69.9	3.3		4.0	1.8	**1.8**	**19.1**				
	Swine (301)	7.0	**4.3**	2.4-7.4							83.1	3.3	0.7	1.7	7.0	**0.7**	**3.7**				
Cephalosporins																					
Ceftiofur	Chickens (1989)	0.2	**12.2**	10.8-13.7				0.2	1.9	74.5	10.9	0.2	0.2	**0.5**	**11.7**						
	Turkeys (227)	0.0	**3.5**	1.6-7.1						63.4	32.6	0.4			**3.5**						
	Cattle (329)	0.0	**21.6**	17.4-26.5				0.3	0.3	53.8	23.1	0.9		**1.5**	**20.1**						
	Swine (301)	0.0	**3.7**	2.0-6.7				0.3		62.8	33.2				**3.7**						
Ceftriaxone	Chickens (1989)	10.4	**0.3**	0.1-0.7					87.5	0.3	0.1		0.1	1.4	8.9	1.5	**0.3**				
	Turkeys (227)	2.6	**0.9**	0.2-3.5					96.5						0.4	2.2	**0.9**				
	Cattle (329)	14.6	**2.1**	0.9-4.5					79.0		0.3		0.3	3.6	8.2	6.4	**1.2**	**0.9**			
	Swine (301)	3.0	**0.0**	0.0-1.6					96.3					0.7	1.7	1.3					

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 3b. Distribution of MICs and Occurrence of Resistance by Animal Source among all *Salmonella* Isolates from Food Animals, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	[95% CI][3]	Distribution (%) of MICs (µg/ml)[4] 0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Cephamycins																					
Cefoxitin	Chickens (1989)	0.4	**12.0**	10.6-13.5							5.5	66.7	14.2	1.3	0.4	**9.6**	**2.4**				
	Turkeys (227)	0.0	**3.5**	1.6-7.1							1.3	56.8	34.4	4.0		**0.9**	**2.6**				
	Cattle (329)	2.1	**19.8**	15.7-24.6							3.0	32.8	39.2	3.0	2.1	**8.5**	**11.2**				
	Swine (301)	0.7	**3.7**	2.0-6.7						0.3	2.3	33.6	56.1	3.3	0.7	**2.0**	**1.7**				
Folate Pathway Inhibitors																					
Sulfonamides	Chickens (1989)	0.0	**8.5**	7.3-9.8											44.0	38.9	7.6	0.9	0.2	**8.5**	
	Turkeys (227)	0.0	**37.0**	30.8-43.7											19.4	32.6	9.7	1.3		**37.0**	
	Cattle (329)	0.0	**27.4**	22.7-32.6											17.3	33.1	17.3	4.9		**27.4**	
	Swine (301)	0.0	**32.9**	27.7-38.6											33.6	23.9	8.3	1.0	0.3	**32.9**	
Trimethoprim-Sulfamethoxazole	Chickens (1989)	0.0	**0.2**	0.1-0.6				77.8	21.3	0.5	0.2	0.1		**0.2**							
	Turkeys (227)	0.0	**1.8**	0.6-4.8				67.4	29.5	1.3				**1.8**							
	Cattle (329)	0.0	**4.9**	2.9-8.0				64.1	24.6	5.5	0.9			**4.9**							
	Swine (301)	0.0	**2.3**	1.0-4.9				62.1	30.2	5.0	0.3			**2.3**							
Phenicols																					
Chloramphenicol	Chickens (1989)	0.6	**1.8**	1.3-2.5								4.0	53.5	40.1	0.6	**0.2**	**1.7**				
	Turkeys (227)	2.6	**4.8**	2.5-8.7									37.9	54.6	2.6		**4.8**				
	Cattle (329)	2.4	**21.9**	17.6-26.8								0.9	23.1	51.7	2.4	**0.3**	**21.6**				
	Swine (301)	3.7	**10.6**	7.5-14.8								0.7	21.6	63.5	3.7		**10.6**				
Quinolones																					
Ciprofloxacin	Chickens (1989)	0.0	**0.0**	0.0-0.2	96.2	3.5	0.1	0.2	0.1												
	Turkeys (227)	0.0	**0.0**	0.0-2.1	91.2	6.6			1.8	0.4											
	Cattle (329)	0.0	**0.0**	0.0-1.4	92.1	6.4		0.3	0.9	0.3											
	Swine (301)	0.0	**0.0**	0.0-1.6	92.0	7.6			0.3												
Nalidixic Acid	Chickens (1989)	0.0	**0.3**	0.1-0.7						0.2	39.7	58.5	1.3	0.1		**0.3**					
	Turkeys (227)	0.0	**2.2**	0.8-5.3						0.4	17.2	77.5	2.6			**2.2**					
	Cattle (329)	0.0	**1.5**	0.5-3.7						0.3	14.9	82.4	0.6	0.3		**1.5**					
	Swine (301)	0.0	**0.3**	0-2.1						0.3	16.6	80.4	2.3			**0.3**					
Tetracyclines																					
Tetracycline	Chickens (1989)	0.4	**28.3**	26.3-30.3									71.3	0.4	**0.2**	**1.2**	**26.9**				
	Turkeys (227)	0.4	**54.6**	47.9-61.2									44.9	0.4		**4.4**	**50.2**				
	Cattle (329)	0.9	**34.0**	28.9-39.4									65.0	0.9	**1.2**	**5.5**	**27.4**				
	Swine (301)	1.0	**54.8**	49.0-60.5									44.2	1.0		**11.3**	**43.5**				

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 4a. Antimicrobial Resistance among all *Salmonella* Isolates from Food Animals by Year, 1997-2005

Year			1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested		Chickens	214	561	1438	1173	1307	1500	1158	1280	1989
		Turkeys	107	240	713	518	550	244	262	236	227
		Cattle	24	284	1610	1388	893	1008	670	607	329
		Swine	111	793	876	451	418	379	211	308	301
Antimicrobial Class	**Antimicrobial**	**Isolate Source**									
Aminoglycosides	Amikacin	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
		Turkeys	0.0% 0	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% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
		Swine	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
	Gentamicin	Chickens	17.8% 38	15.3% 86	10.4% 150	14.9% 175	7.9% 103	5.5% 83	6.3% 73	4.9% 63	4.3% 85
		Turkeys	20.6% 22	18.3% 44	17.5% 125	16.2% 84	20.9% 115	19.3% 47	21.0% 55	25.4% 60	22.9% 52
		Cattle	0.0% 0	1.8% 5	1.6% 25	2.1% 29	2.1% 19	2.6% 26	2.7% 18	1.8% 11	2.4% 8
		Swine	0.9% 1	0.8% 6	1.1% 10	1.3% 6	1.4% 6	0.8% 3	0.5% 1	1.3% 4	2.7% 8
	Kanamycin	Chickens	2.3% 5	3.2% 18	1.2% 17	4.1% 48	2.4% 31	2.0% 30	2.8% 32	2.7% 34	2.5% 49
		Turkeys	24.3% 26	17.1% 41	21.5% 153	21.4% 111	22.9% 126	24.2% 59	16.0% 42	14.4% 34	19.8% 45
		Cattle	8.3% 2	9.5% 27	7.1% 115	6.6% 92	6.9% 62	10.1% 102	13.7% 92	8.9% 54	13.1% 43
		Swine	11.7% 13	7.2% 57	6.7% 59	9.3% 42	6.9% 29	4.2% 16	5.7% 12	3.9% 12	5.0% 15
	Streptomycin	Chickens	24.3% 52	27.8% 156	27.5% 396	28.6% 335	21.0% 275	22.9% 343	19.6% 227	22.2% 284	23.3% 464
		Turkeys	34.6% 37	40.8% 98	43.6% 311	41.9% 217	46.7% 257	37.7% 92	29.4% 77	33.9% 80	40.1% 91
		Cattle	12.5% 3	16.2% 46	15.4% 248	21.3% 296	20.3% 181	25.9% 261	28.7% 192	20.9% 127	24.3% 80
		Swine	27.9% 31	29.4% 233	29.3% 257	39.2% 177	35.6% 149	40.1% 152	30.8% 65	36.4% 112	36.5% 110
Aminopenicillins	Ampicillin	Chickens	11.7% 25	12.8% 72	12.4% 179	13.0% 152	9.4% 123	14.3% 215	13.7% 159	14.5% 185	14.0% 279
		Turkeys	12.1% 13	10.4% 25	17.7% 126	16.2% 84	19.5% 107	18.0% 44	18.7% 49	22.0% 52	22.9% 52
		Cattle	12.5% 3	9.2% 26	12.5% 202	18.7% 259	17.9% 160	23.9% 241	28.1% 188	19.3% 117	26.7% 88
		Swine	16.2% 18	12.9% 102	10.8% 95	18.8% 85	11.7% 49	13.7% 52	12.8% 27	16.2% 50	13.6% 41

Table 4b. Antimicrobial Resistance among all *Salmonella* Isolates from Food Animals by Year, 1997-2005

Year			1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested		Chickens	214	561	1438	1173	1307	1500	1158	1280	1989
		Turkeys	107	240	713	518	550	244	262	236	227
		Cattle	24	284	1610	1388	893	1008	670	607	329
		Swine	111	793	876	451	418	379	211	308	301
Antimicrobial Class	**Antimicrobial**	**Isolate Source**									
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin-Clavulanic Acid	Chickens	0.5% 1	2.0% 11	4.9% 70	7.3% 86	4.5% 59	10.2% 153	9.7% 112	12.4% 159	12.1% 241
		Turkeys	4.7% 5	0.4% 1	4.3% 31	3.5% 18	6.9% 38	3.7% 9	1.5% 4	4.7% 11	3.5% 8
		Cattle	8.3% 2	2.5% 7	3.9% 62	9.9% 138	11.8% 105	17.7% 178	21.0% 141	13.5% 82	21.0% 69
		Swine	0.0% 0	0.4% 3	1.0% 9	1.8% 8	2.6% 11	3.7% 14	3.8% 8	1.9% 6	4.3% 13
Cephalosporins	Ceftiofur	Chickens	0.5% 1	2.0% 11	5.2% 75	7.6% 89	4.1% 54	10.2% 153	9.8% 113	12.4% 159	12.2% 242
		Turkeys	3.7% 4	0.4% 1	4.6% 33	3.3% 17	5.1% 28	3.3% 8	1.5% 4	4.7% 11	3.5% 8
		Cattle	0.0% 0	2.1% 6	4.2% 67	9.8% 136	11.4% 102	17.4% 175	21.0% 141	13.3% 81	21.6% 71
		Swine	0.0% 0	0.1% 1	1.9% 17	1.3% 6	2.2% 9	3.2% 12	4.3% 9	1.9% 6	3.7% 11
	Ceftriaxone	Chickens	0.0% 0	0.0% 0	0.0% 0	0.1% 1	0.0% 0	0.3% 5	0.1% 1	0.5% 6	0.3% 5
		Turkeys	0 0	0.0% 0	0.8% 6	0.4% 2	0.2% 1	0.0% 0	0.4% 1	0.4% 1	0.9% 2
		Cattle	0.0% 0	0.0% 0	0.1% 1	0.1% 1	0.1% 1	0.2% 2	0.1% 1	1.3% 8	2.1% 7
		Swine	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
	Cephalothin	Chickens	1.4% 3	4.5% 25	5.8% 83	7.8% 91	4.7% 62	10.5% 158	10.4% 121	10.4% 121	
		Turkeys	5.6% 6	5.0% 12	10.5% 75	8.3% 43	13.1% 72	9.8% 24	11.1% 29	11.1% 29	
		Cattle	0.0% 0	2.1% 6	4.7% 76	9.9% 137	11.6% 104	17.7% 178	21.2% 142	21.2% 142	
		Swine	0.0% 0	0.1% 1	0.8% 7	2.4% 11	2.2% 9	3.2% 12	3.8% 8	3.8% 8	
Cephamycins	Cefoxitin	Chickens				7.2% 85	4.1% 53	8.7% 130	8.2% 95	12.4% 159	12.0% 238
		Turkeys				3.3% 17	4.5% 25	2.5% 6	1.1% 3	5.1% 12	3.5% 8
		Cattle				9.1% 126	11.1% 99	15.9% 160	17.8% 119	13.2% 80	19.8% 65
		Swine				1.3% 6	2.2% 9	2.9% 11	4.3% 9	1.9% 6	3.7% 11

Table 4c. Antimicrobial Resistance among all *Salmonella* Isolates from Food Animals by Year, 1997-2005

Number of Isolates Tested			1997	1998	1999	2000	2001	2002	2003	2004	2005
		Chickens	214	561	1438	1173	1307	1500	1158	1280	1989
		Turkeys	107	240	713	518	550	244	262	236	227
		Cattle	24	284	1610	1388	893	1008	670	607	329
		Swine	111	793	876	451	418	379	211	308	301
Antimicrobial Class	**Antimicrobial**	**Isolate Source**									
Folate Pathway Inhibitors	Sulfanomides	Chickens	24.8% 53	23.7% 133	15.9% 229	18.4% 216	11.8% 154	8.9% 133	10.3% 119	11.9% 152	8.5% 169
		Turkeys	37.4% 40	32.1% 77	36.0% 257	25.1% 130	38.0% 209	30.3% 74	28.2% 74	36.4% 86	37.0% 84
		Cattle	20.8% 5	15.5% 44	15.0% 242	19.9% 276	19.7% 176	22.3% 225	25.1% 168	22.7% 138	27.4% 90
		Swine	34.2% 38	29.0% 230	30.7% 269	35.7% 161	34.9% 146	34.6% 131	25.1% 53	37.0% 114	32.9% 99
	Trimethoprim-Sulfamethoxazole	Chickens	0.5% 1	1.2% 7	1.1% 16	0.4% 5	0.5% 6	0.8% 12	0.3% 4	0.2% 3	0.2% 4
		Turkeys	3.7% 4	2.5% 6	4.2% 30	1.5% 8	2.5% 14	2.5% 6	2.3% 6	0.8% 2	1.8% 4
		Cattle	4.2% 1	2.5% 7	2.4% 39	2.2% 30	2.6% 23	2.5% 25	3.3% 22	1.5% 9	4.9% 16
		Swine	1.8% 2	0.3% 2	1.1% 10	0.9% 4	0.0% 0	1.6% 6	2.4% 5	1.6% 5	2.3% 7
Phenicols	Chloramphenicol	Chickens	2.3% 5	2.9% 16	1.8% 26	4.6% 54	2.5% 33	2.4% 36	2.1% 24	1.3% 16	1.8% 36
		Turkeys	3.7% 4	0.8% 2	4.1% 29	4.1% 21	3.8% 21	5.3% 13	4.2% 11	4.7% 11	4.8% 11
		Cattle	4.2% 1	5.6% 16	8.5% 137	15.1% 209	16.5% 147	20.6% 208	25.1% 168	17.6% 107	21.9% 72
		Swine	11.7% 13	8.4% 67	8.0% 70	12.4% 56	7.7% 32	10.0% 38	8.5% 18	12.7% 39	10.6% 32
Quinolones	Ciprofloxacin	Chickens	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.1% 1	0.0% 0	0.0% 0
		Turkeys	0.0% 0	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% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
		Swine	0.0% 0	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	Chickens	0.0% 0	0.2% 1	0.2% 3	0.5% 6	0.0% 0	0.8% 12	0.4% 5	0.5% 6	0.3% 6
		Turkeys	4.7% 5	2.1% 5	5.3% 38	5.4% 28	5.1% 28	5.3% 13	3.8% 10	2.1% 5	2.2% 5
		Cattle	0.0% 0	0.4% 1	0.1% 1	0.4% 6	0.4% 4	0.4% 4	0.4% 3	2.0% 12	1.5% 5
		Swine	0.0% 0	0.0% 0	0.0% 0	0.2% 1	0.0% 0	0.3% 1	0.0% 0	0.0% 0	0.3% 1
Tetracyclines	Tetracycline	Chickens	20.6% 44	20.5% 115	25.0% 359	26.3% 308	21.9% 286	24.9% 374	26.2% 303	27.4% 351	28.3% 563
		Turkeys	52.3% 56	45.8% 110	52.9% 377	56.2% 291	54.9% 302	54.5% 133	58.8% 154	48.3% 114	54.6% 124
		Cattle	25.0% 6	24.3% 69	20.9% 336	25.8% 358	26.3% 235	32.0% 323	36.9% 247	31.8% 193	34.0% 112
		Swine	52.3% 58	47.5% 377	48.4% 424	54.3% 245	53.1% 222	57.8% 219	43.1% 91	58.8% 181	54.8% 165

Table 5a. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Chicken, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	95% CI[3]	Distribution (%) of MICs (μg/ml)[4]																
					0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Aminoglycosides																					
Amikacin	Kentucky (919)	0.0	**0**	0.0-0.5						21.9	62.8	13.8	1.5								
	Heidelberg (283)	0.0	**0**	0.0-1.7						27.9	61.5	10.2	0.4								
	Enteritidis (173)	0.0	**0**	0.0-2.7						38.2	54.3	6.9	0.6								
	4,[5],12:i:- (102)	0.0	**0**	0.0-4.5						1	79.4	18.6	1								
	Typhimurium var. 5- (100)	0.0	**0**	0.0-4.6						31	54	14	1								
	Typhimurium (83)	0.0	**0**	0.0-5.5						8.4	77.1	13.3	1.2								
	Montevideo (62)	0.0	**0**	0.0-7.3							62.9	30.6	6.5								
	Schwarzengrund (51)	0.0	**0**	0.0-8.7							72.5	21.6	5.9								
	Thompson (23)	0.0	**0**	0.0-17.8						21.7	60.9	17.4									
	Mbandaka (20)	0.0	**0**	0.0-20.0						5	50	40	5								
Gentamicin	Kentucky (919)	0.1	**1.4**	0.8-2.5					73.3	24.4	0.8										
	Heidelberg (283)	1.1	**9.2**	6.2-13.3					75.3	13.8			0.7								
	Enteritidis (173)	0.0	**0**	0.0-2.7					90.8	9.2											
	4,[5],12:i:- (102)	0.0	**9.8**	5.1-17.7					61.8	26.5	2				**7.8**	**2**					
	Typhimurium var. 5- (100)	2.0	**3**	0.8-9.2					71	24											
	Typhimurium (83)	0.0	**6**	2.2-14.1					60.2	30.1	2.4		1.2								
	Montevideo (62)	0.0	**11.3**	5.0-22.5					45.2	41.9	1.6										
	Schwarzengrund (51)	2.0	**3.9**	0.7-14.6					39.2	52.9	2										
	Thompson (23)	0.0	**4.3**	0.2-23.9					87	8.7											
	Mbandaka (20)	0.0	**20**	6.6-44.3					55	25											
Kanamycin	Kentucky (919)	0.0	**0.5**	0.2-1.3										99.2	0.2			**0.5**			
	Heidelberg (283)	0.0	**6.7**	4.2-10.4										92.9	0.4		**2.5**	**4.2**			
	Enteritidis (173)	0.0	**0**	0.0-2.7										100							
	4,[5],12:i:- (102)	0.0	**0**	0.0-4.5										99	1						
	Typhimurium var. 5- (100)	0.0	**12**	6.6-20.4										88				**12**			
	Typhimurium (83)	0.0	**2.4**	0.4-9.2										97.6				**2.4**			
	Montevideo (62)	0.0	**8.1**	3.0-18.6										91.9			**3.2**	**4.8**			
	Schwarzengrund (51)	0.0	**0**	0.0-8.7										98	2						
	Thompson (23)	0.0	**0**	0.0-17.8										100							
	Mbandaka (20)	0.0	**0**	0.0-20.0										100							
Streptomycin	Kentucky (919)	0.0	**36.3**	33.2-39.5												63.7	**29.7**	**6.6**			
	Heidelberg (283)	0.0	**15.5**	11.6-20.4												84.5	**7.8**	**7.8**			
	Enteritidis (173)	0.0	**0.6**	0-3.7												99.4	**0.6**				
	4,[5],12:i:- (102)	0.0	**9.8**	5.1-17.7												90.2	**8.8**	**1**			
	Typhimurium var. 5- (100)	0.0	**15**	8.9-23.9												85	**13**	**2**			
	Typhimurium (83)	0.0	**12**	6.2-21.4												88	**6**	**6**			
	Montevideo (62)	0.0	**9.7**	4.0-20.6												90.3	**6.5**	**3.2**			
	Schwarzengrund (51)	0.0	**3.9**	0.7-14.6												96.1		**3.9**			
	Thompson (23)	0.0	**8.7**	1.5-29.5												91.3	**4.3**	**4.3**			
	Mbandaka (20)	0.0	**20**	6.6-44.3												80	**15**	**5**			

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 5b. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Chicken, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	95% CI[3]	Distribution (%) of MICs (µg/ml)[4]																
					0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Aminopenicillins																					
Ampicillin	Kentucky (919)	0.1	**14.4**	12.2-16.9							71.5	13.7	0.2	0.1	0.1		**14.4**				
	Heidelberg (283)	0.0	**25.1**	20.2-30.6							54.4	19.1	0.7	0.7		**0.4**	**24.7**				
	Enteritidis (173)	0.6	**1.2**	0.2-4.6							67.1	29.5	1.7		0.6	**0.6**	**0.6**				
	4,[5],12:i:- (102)	0.0	**8.8**	4.4-16.5							71.6	19.6					**8.8**				
	Typhimurium var. 5- (100)	0.0	**38**	28.6-48.3							51	10	1				**38**				
	Typhimurium (83)	0.0	**13.3**	7.2-22.9							69.9	16.9					**13.3**				
	Montevideo (62)	0.0	**1.6**	0.1-9.8							87.1	11.3					**1.6**				
	Schwarzengrund (51)	2.0	**3.9**	0.7-14.6							60.8	33.3			2		**3.9**				
	Thompson (23)	0.0	**4.3**	0.2-23.9							87	8.7					**4.3**				
	Mbandaka (20)	0.0	**0**	0.0-20.0							90	10									
β-Lactam/β-Lactamase Inhibitor Combinations																					
Amoxicillin-Clavulanic Acid	Kentucky (919)	0.2	**13.5**	11.4-15.9							82.7	2.6	0.2	0.8	0.2	**0.4**	**13.1**				
	Heidelberg (283)	2.5	**21.9**	17.3-27.3							73.1	1.1	0.7	0.7	2.5		**21.9**				
	Enteritidis (173)	0.0	**0.6**	0-3.7							96	2.9		0.6		**0.6**					
	4,[5],12:i:- (102)	0.0	**5.9**	2.4-12.9							90.2	1	1	2			**5.9**				
	Typhimurium var. 5- (100)	9.0	**27**	18.8-37.0							60	2		2	9		**27**				
	Typhimurium (83)	2.4	**10.8**	5.4-20.0							84.3	2.4			2.4		**10.8**				
	Montevideo (62)	0.0	**0**	0.0-7.3							95.2	3.2		1.6							
	Schwarzengrund (51)	0.0	**3.9**	0.7-14.6							84.3	9.8		2			**3.9**				
	Thompson (23)	0.0	**4.3**	0.2-23.9							95.7						**4.3**				
	Mbandaka (20)	0.0	**0**	0.0-20.0							100										
Cephalosporins																					
Ceftiofur	Kentucky (919)	0.1	**13.5**	11.4-15.9					3.7	75.1	7.6		0.1	**0.4**	**13.1**						
	Heidelberg (283)	0.0	**21.9**	17.3-27.3					0.4	72.8	4.9			**0.7**	**21.2**						
	Enteritidis (173)	1.2	**1.2**	0.2-4.6						61.3	35.3	1.2	1.2	**0.6**	**0.6**						
	4,[5],12:i:- (102)	0.0	**5.9**	2.4-12.9					2	89.2	2.9				**5.9**						
	Typhimurium var. 5- (100)	0.0	**27**	18.8-37.0						65	8			**2**	**25**						
	Typhimurium (83)	0.0	**10.8**	5.4-20.0				2.4		78.3	8.4				**10.8**						
	Montevideo (62)	0.0	**0**	0.0-7.3						96.8	3.2										
	Schwarzengrund (51)	0.0	**3.9**	0.7-14.6						90.2	3.9	2			**3.9**						
	Thompson (23)	0.0	**4.3**	0.2-23.9						95.7					**4.3**						
	Mbandaka (20)	0.0	**0**	0.0-20.0				5		55	40										
Ceftriaxone	Kentucky (919)	11.4	**0**	0.0-0.5					86.2	0.2			0.1	2.1	9.9	1.5					
	Heidelberg (283)	18.7	**1.4**	0.4-3.8					78.1				0.4	1.4	16.6	2.1	**1.4**				
	Enteritidis (173)	0.0	**0**	0.0-2.7					98.3	0.6	0.6			0.6							
	4,[5],12:i:- (102)	4.9	**0**	0.0-4.5					94.1					1	4.9						
	Typhimurium var. 5- (100)	26.0	**0**	0.0-4.6					73					1	22	4					
	Typhimurium (83)	9.6	**0**	0.0-5.5					88	1.2				1.2	9.6						
	Montevideo (62)	0.0	**0**	0.0-7.3					100												
	Schwarzengrund (51)	0.0	**2**	0.1-11.9					96.1					2			**2**				
	Thompson (23)	4.3	**0**	0.0-17.8					95.7							4.3					
	Mbandaka (20)	0.0	**0**	0.0-20.0					100												

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 5c. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Chicken, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	[95% CI][3]	Distribution (%) of MICs (µg/ml)[4]																
					0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Cephamycins																					
Cefoxitin	Kentucky (919)	0.5	**13.3**	11.2-15.7							6.4	68.1	10.4	1.2	0.5	**12.5**	**0.8**				
	Heidelberg (283)	0.7	**21.6**	17.0-26.9							11	59.4	6.7	0.7	0.7	**15.2**	**6.4**				
	Enteritidis (173)	0.0	**0.6**	0-3.7							3.5	78.6	13.9	3.5		**0.6**					
	4,[5],12:i:- (102)	1.0	**5.9**	2.4-12.9							3.9	84.3	4.9		1	**5.9**					
	Typhimurium var. 5- (100)	0.0	**27**	18.8-37.0							1	51	20	1		**14**	**13**				
	Typhimurium (83)	0.0	**10.8**	5.4-20.0							2.4	79.5	7.2			**7.2**	**3.6**				
	Montevideo (62)	0.0	**0**	0.0-7.3								87.1	12.9								
	Schwarzengrund (51)	0.0	**3.9**	0.7-14.6							2	84.3	7.8	2		**2**	**2**				
	Thompson (23)	0.0	**4.3**	0.2-23.9							8.7	82.6	4.3				**4.3**				
	Mbandaka (20)	0.0	**0**	0.0-20.0									100								
Folate Pathway Inhibitors																					
Sulfonamides	Kentucky (919)	0.0	**2.2**	1.4-3.4											50.5	40.2	6.7	0.4		**2.2**	
	Heidelberg (283)	0.0	**10.6**	7.4-14.9											67.5	20.8	1.1			**10.6**	
	Enteritidis (173)	0.0	**0**	0.0-2.7											20.8	61.8	17.3				
	4,[5],12:i:- (102)	0.0	**9.8**	5.1-17.7											25.5	54.9	8.8		1	**9.8**	
	Typhimurium var. 5- (100)	0.0	**53**	42.8-63.0											19	26	2			**53**	
	Typhimurium (83)	0.0	**18.1**	10.8-28.4											36.1	39.8	6			**18.1**	
	Montevideo (62)	0.0	**9.7**	4.0-20.6											51.6	35.5	3.2			**9.7**	
	Schwarzengrund (51)	0.0	**11.8**	4.9-24.6											15.7	37.3	21.6	11.8	2	**11.8**	
	Thompson (23)	0.0	**8.7**	1.5-29.5											65.2	17.4	8.7			**8.7**	
	Mbandaka (20)	0.0	**25**	9.6-49.4											5	45	20	5		**25**	
Trimethoprim-Sulfamethoxazole	Kentucky (919)	0.0	**0**	0.0-0.5				82.4	17.4	0.1	0.1										
	Heidelberg (283)	0.0	**0.4**	0-2.3				73.5	25.1	0.4	0.4	0.4		**0.4**							
	Enteritidis (173)	0.0	**0**	0.0-2.7				75.7	24.3												
	4,[5],12:i:- (102)	0.0	**0**	0.0-4.5				79.4	20.6												
	Typhimurium var. 5- (100)	0.0	**0**	0.0-4.6				52	45	3											
	Typhimurium (83)	0.0	**0**	0.0-5.5				72.3	24.1	2.4	1.2										
	Montevideo (62)	0.0	**0**	0.0-7.3				74.2	24.2	1.6											
	Schwarzengrund (51)	0.0	**0**	0.0-8.7				62.7	37.3												
	Thompson (23)	0.0	**4.3**	0.2-23.9				91.3	4.3					**4.3**							
	Mbandaka (20)	0.0	**5**	0.3-26.9				80	15					**5**							

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 5d. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Chicken, 2005

					Distribution (%) of MICs (µg/ml)[4]																
Antimicrobial	**Isolate Source (# of Isolates)**	**%I[1]**	**%R[2]**	**[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**
Phenicols																					
Chloramphenicol	Kentucky (919)	0.1	**0.5**	0.2-1.3								8.1	76.5	14.8	0.1	**0.1**	**0.4**				
	Heidelberg (283)	1.8	**3.2**	1.6-6.2									23.7	71.4	1.8		**3.2**				
	Enteritidis (173)	0.6	**0.6**	0-3.7									37.6	61.3	0.6	**0.6**					
	4,[5],12:i:- (102)	0.0	**0**	0.0-4.5									48	52							
	Typhimurium var. 5- (100)	0.0	**10**	5.2-18.0									33	57			**10**				
	Typhimurium (83)	0.0	**6**	2.2-14.1								2.4	33.7	57.8			**6**				
	Montevideo (62)	0.0	**1.6**	0.1-9.8									17.7	80.6			**1.6**				
	Schwarzengrund (51)	0.0	**2**	0.1-11.9									37.3	60.8		**2**					
	Thompson (23)	0.0	**4.3**	0.2-23.9									69.6	26.1			**4.3**				
	Mbandaka (20)	5.0	**0**	0.0-20.0									30	65	5						
Quinolones																					
Ciprofloxacin	Kentucky (919)	0.0	**0**	0.0-0.5	99.1	0.8		0.1													
	Heidelberg (283)	0.0	**0**	0.0-1.7	96.5	3.5															
	Enteritidis (173)	0.0	**0**	0.0-2.7	82.7	16.8			0.6												
	4,[5],12:i:- (102)	0.0	**0**	0.0-4.5	98	2															
	Typhimurium var. 5- (100)	0.0	**0**	0.0-4.6	94	5			1												
	Typhimurium (83)	0.0	**0**	0.0-5.5	95.2	3.6	1.2														
	Montevideo (62)	0.0	**0**	0.0-7.3	91.9	3.2		4.8													
	Schwarzengrund (51)	0.0	**0**	0.0-8.7	100																
	Thompson (23)	0.0	**0**	0.0-17.8	95.7	4.3															
	Mbandaka (20)	0.0	**0**	0.0-20.0	100																
Nalidixic Acid	Kentucky (919)	0.0	**0**	0.0-0.5							0.3	73.6	25.5	0.5	0.1						
	Heidelberg (283)	0.0	**0**	0.0-1.7								2.8	95.8	1.4							
	Enteritidis (173)	0.0	**0.6**	0-3.7								5.8	85	8.7			**0.6**				
	4,[5],12:i:- (102)	0.0	**0**	0.0-4.5								15.7	84.3								
	Typhimurium var. 5- (100)	0.0	**1**	0.1-6.2								9	90				**1**				
	Typhimurium (83)	0.0	**1.2**	0.1-7.5								12	85.5		1.2		**1.2**				
	Montevideo (62)	0.0	**4.8**	1.2-14.3								3.2	91.9				**4.8**				
	Schwarzengrund (51)	0.0	**0**	0.0-8.7								7.8	92.2								
	Thompson (23)	0.0	**0**	0.0-17.8								8.7	91.3								
	Mbandaka (20)	0.0	**0**	0.0-20.0								65	35								
Tetracyclines																					
Tetracycline	Kentucky (919)	0.5	**43.9**	40.7-47.2									55.6	0.5	**0.1**	**0.5**	**43.2**				
	Heidelberg (283)	0.0	**14.5**	10.7-19.3									85.5			**1.4**	**13.1**				
	Enteritidis (173)	1.2	**0.6**	0-3.7									98.3	1.2			**0.6**				
	4,[5],12:i:- (102)	0.0	**4.9**	1.8-11.6									95.1				**4.9**				
	Typhimurium var. 5- (100)	0.0	**50**	39.9-60.1									50		**1**	**9**	**40**				
	Typhimurium (83)	0.0	**15.7**	9.0-25.7									84.3		**1.2**	**2.4**	**12**				
	Montevideo (62)	0.0	**4.8**	1.2-14.3									95.2			**1.6**	**3.2**				
	Schwarzengrund (51)	0.0	**5.9**	1.5-17.2									94.1			**2**	**3.9**				
	Thompson (23)	0.0	**4.3**	0.2-23.9									95.7				**4.3**				
	Mbandaka (20)	0.0	**10**	1.8-33.1									90			**5**	**5**				

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 6a. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Turkey, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	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
					Distribution (%) of MICs (µg/ml)[4]																
Aminoglycosides																					
Amikacin	Hadar (48)	0.0	**0.0**	0.0-9.2						4.2	72.9	22.9									
	Saintpaul (28)	0.0	**0.0**	0.0-15.0						10.7	78.6	10.7									
	Heidelberg (25)	0.0	**0.0**	0.0-16.6						40.0	52.0	8.0									
	Reading (19)	0.0	**0.0**	0.0-20.9							89.5	5.3	5.3								
	Schwarzengrund (14)	0.0	**0.0**	0.0-26.8							50.0	50.0									
	IIIa 18:z4,z23:- (11)	0.0	**0.0**	0.0-32.1						18.2	81.8										
	Senftenberg (8)	0.0	**0.0**	0.0-40.2							50.0	37.5	12.5								
	Agona (7)	0.0	**0.0**	0.0-43.9						28.6	57.1	14.3									
	Albany (6)	0.0	**0.0**	0.0-48.3							83.3		16.7								
Gentamicin	Hadar (48)	0.0	**12.5**	5.2-25.9					54.2	33.3					**8.3**	**4.2**					
	Saintpaul (28)	25.0	**21.4**	9.0-41.4					35.7	14.3	3.6			25.0	**17.9**	**3.6**					
	Heidelberg (25)	4.0	**36.0**	18.7-57.4					60.0					4.0	**20.0**	**16.0**					
	Reading (19)	0.0	**0.0**	0.0-20.9					68.4	31.6											
	Schwarzengrund (14)	0.0	**7.1**	0.4-35.8					35.7	42.9	7.1	7.1			**7.1**						
	IIIa 18:z4,z23:- (11)	0.0	**54.5**	24.5-81.8					45.5						**54.5**						
	Senftenberg (8)	0.0	**12.5**	0.7-53.3					62.5	25.0						**12.5**					
	Agona (7)	0.0	**42.9**	11.8-79.8					28.6	28.6					**42.9**						
	Albany (6)	0.0	**50.0**	13.9-86.1					33.3	16.7					**50.0**						
Kanamycin	Hadar (48)	0.0	**4.2**	0.7-15.5										95.8				**4.2**			
	Saintpaul (28)	0.0	**53.6**	34.2-72.0										46.4			**14.3**	**39.3**			
	Heidelberg (25)	0.0	**44.0**	25.0-64.7										56.0			**4.0**	**40.0**			
	Reading (19)	0.0	**5.3**	0.3-28.2										94.7				**5.3**			
	Schwarzengrund (14)	0.0	**0.0**	0.0-26.8										100.0							
	IIIa 18:z4,z23:- (11)	0.0	**0.0**	0.0-32.1										100.0							
	Senftenberg (8)	0.0	**37.5**	10.2-74.1										62.5				**37.5**			
	Agona (7)	0.0	**42.9**	11.8-79.8										57.1				**42.9**			
	Albany (6)	0.0	**0.0**	0.0-48.3										100.0							
Streptomycin	Hadar (48)	0.0	**66.7**	51.5-79.2												33.3	**50.0**	**16.7**			
	Saintpaul (28)	0.0	**28.6**	14.0-48.9												71.4	**25.0**	**3.6**			
	Heidelberg (25)	0.0	**44.0**	25.0-64.7												56.0	**24.0**	**20.0**			
	Reading (19)	0.0	**5.3**	0.3-28.2												94.7	**5.3**				
	Schwarzengrund (14)	0.0	**14.3**	2.5-43.9												85.7	**14.3**				
	IIIa 18:z4,z23:- (11)	0.0	**45.5**	18.2-75.5												54.5	**36.4**	**9.1**			
	Senftenberg (8)	0.0	**37.5**	10.2-74.1												62.5		**37.5**			
	Agona (7)	0.0	**28.6**	5.1-69.8												71.4		**28.6**			
	Albany (6)	0.0	**50.0**	13.9-86.1												50.0	**50.0**				

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 6b. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Turkey, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	95% CI[3]	Distribution (%) of MICs (µg/ml)[4] 0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Aminopenicillins																					
Ampicillin	Hadar (48)	0.0	**14.6**	6.6-28.4							66.7	16.7		2.1			**14.6**				
	Saintpaul (28)	0.0	**46.4**	28.0-65.8							39.3	14.3					**46.4**				
	Heidelberg (25)	0.0	**24.0**	10.2-45.5							60.0	12.0	4.0				**24.0**				
	Reading (19)	0.0	**15.8**	4.2-40.5							68.4	10.5	5.3				**15.8**				
	Schwarzengrund (14)	0.0	**7.1**	0.4-35.8							85.7	7.1					**7.1**				
	IIIa 18:z4,z23:- (11)	0.0	**0.0**	0.0-32.1							72.7	27.3									
	Senftenberg (8)	0.0	**50.0**	17.4-82.6							50.0						**50.0**				
	Agona (7)	0.0	**57.1**	20.2-88.2							42.9						**57.1**				
	Albany (6)	0.0	**0.0**	0.0-48.3							66.7	33.3									
β-Lactam/β-Lactamase Inhibitor Combinations																					
Amoxicillin-Clavulanic Acid	Hadar (48)	8.3	**0.0**	0.0-9.2							77.1	8.3		6.2	8.3						
	Saintpaul (28)	46.4	**0.0**	0.0-15.0							46.4	7.1			46.4						
	Heidelberg (25)	8.0	**0.0**	0.0-16.6							72.0	4.0		16.0	8.0						
	Reading (19)	10.5	**0.0**	0.0-20.9							73.7	10.5		5.3	10.5						
	Schwarzengrund (14)	0.0	**0.0**	0.0-26.8							85.7	7.1		7.1							
	IIIa 18:z4,z23:- (11)	0.0	**0.0**	0.0-32.1							100.0										
	Senftenberg (8)	25.0	**12.5**	0.7-53.3							50.0			12.5	25.0		**12.5**				
	Agona (7)	14.3	**28.6**	5.1-69.8							42.9			14.3	14.3		**28.6**				
	Albany (6)	0.0	**0.0**	0.0-48.3							100.0										
Cephalosporins																					
Ceftiofur	Hadar (48)	0.0	**0.0**	0.0-9.2						66.7	33.3										
	Saintpaul (28)	0.0	**0.0**	0.0-15.0						53.6	46.4										
	Heidelberg (25)	0.0	**0.0**	0.0-16.6						96.0	4.0										
	Reading (19)	0.0	**0.0**	0.0-20.9						47.4	47.4	5.3									
	Schwarzengrund (14)	0.0	**0.0**	0.0-26.8						78.6	21.4										
	IIIa 18:z4,z23:- (11)	0.0	**0.0**	0.0-32.1						100.0											
	Senftenberg (8)	0.0	**12.5**	0.7-53.3						12.5	75.0				**12.5**						
	Agona (7)	0.0	**28.6**	5.1-69.8						42.9	28.6				**28.6**						
	Albany (6)	0.0	**0.0**	0.0-48.3						100.0											
Ceftriaxone	Hadar (48)	0.0	**0.0**	0.0-9.2					100.0												
	Saintpaul (28)	0.0	**0.0**	0.0-15.0					100.0												
	Heidelberg (25)	0.0	**0.0**	0.0-16.6					100.0												
	Reading (19)	0.0	**0.0**	0.0-20.9					100.0												
	Schwarzengrund (14)	0.0	**0.0**	0.0-26.8					100.0												
	IIIa 18:z4,z23:- (11)	0.0	**0.0**	0.0-32.1					100.0												
	Senftenberg (8)	12.5	**0.0**	0.0-40.2					87.5							12.5					
	Agona (7)	14.3	**14.3**	0.8-58.0					71.4							14.3	**14.3**				
	Albany (6)	0.0	**0.0**	0.0-48.3					100.0												

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 6c. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Turkey, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	[95% CI][3]	Distribution (%) of MICs (µg/ml)[4] 0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Cephamycins																					
Cefoxitin	Hadar (48)	0.0	**0.0**	0.0-9.2								77.1	20.8	2.1							
	Saintpaul (28)	0.0	**0.0**	0.0-15.0							3.6	71.4	21.4	3.6							
	Heidelberg (25)	0.0	**0.0**	0.0-16.6							4.0	80.0	16.0								
	Reading (19)	0.0	**0.0**	0.0-20.9								31.6	52.6	15.8							
	Schwarzengrund (14)	0.0	**0.0**	0.0-26.8								92.9	7.1								
	IIIa 18:z4,z23:- (11)	0.0	**0.0**	0.0-32.1								63.6	27.3	9.1							
	Senftenberg (8)	0.0	**12.5**	0.7-53.3									75.0	12.5			**12.5**				
	Agona (7)	0.0	**28.6**	5.1-69.8								14.3	42.9	14.3			**28.6**				
	Albany (6)	0.0	**0.0**	0.0-48.3									100.0								
Folate Pathway Inhibitors																					
Sulfonamides	Hadar (48)	0.0	**10.4**	3.9-23.4											10.4	62.5	12.5	4.2		**10.4**	
	Saintpaul (28)	0.0	**53.6**	34.2-72.0												32.1	14.3			**53.6**	
	Heidelberg (25)	0.0	**52.0**	31.8-71.7											24.0	24.0				**52.0**	
	Reading (19)	0.0	**5.3**	0.3-28.2											10.5	63.2	21.1			**5.3**	
	Schwarzengrund (14)	0.0	**28.6**	9.6-58.0											50.0	21.4				**28.6**	
	IIIa 18:z4,z23:- (11)	0.0	**54.5**	24.5-81.8											45.5					**54.5**	
	Senftenberg (8)	0.0	**37.5**	10.2-74.1												50.0	12.5			**37.5**	
	Agona (7)	0.0	**57.1**	20.2-88.2											28.6	14.3				**57.1**	
	Albany (6)	0.0	**50.0**	13.9-86.1											50.0					**50.0**	
Trimethoprim-Sulfamethoxazole	Hadar (48)	0.0	**0.0**	0.0-9.2				75.0	25.0												
	Saintpaul (28)	0.0	**0.0**	0.0-15.0				53.6	39.3	7.1											
	Heidelberg (25)	0.0	**0.0**	0.0-16.6				56.0	44.0												
	Reading (19)	0.0	**5.3**	0.3-28.2				84.2	10.5					**5.3**							
	Schwarzengrund (14)	0.0	**0.0**	0.0-26.8				71.4	28.6												
	IIIa 18:z4,z23:- (11)	0.0	**0.0**	0.0-32.1				72.7	27.3												
	Senftenberg (8)	0.0	**12.5**	0.7-53.3				62.5	25.0					**12.5**							
	Agona (7)	0.0	**0.0**	0.0-43.9				57.1	42.9												
	Albany (6)	0.0	**0.0**	0.0-48.3				66.7	33.3												

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 6d. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Turkey, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	[95% CI][3]	Distribution (%) of MICs (µg/ml)[4]																
					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	Hadar (48)	0.0	**0.0**	0.0-9.2									68.8	31.2							
	Saintpaul (28)	0.0	**0.0**	0.0-15.0									21.4	78.6							
	Heidelberg (25)	4.0	**0.0**	0.0-16.6									12.0	84.0	4.0						
	Reading (19)	21.1	**0.0**	0.0-20.9										78.9	21.1						
	Schwarzengrund (14)	0.0	**0.0**	0.0-26.8									57.1	42.9							
	IIIa 18:z4,z23:- (11)	0.0	**0.0**	0.0-32.1									81.8	18.2							
	Senftenberg (8)	12.5	**25.0**	4.5-64.4									12.5	50.0	12.5		**25.0**				
	Agona (7)	0.0	**28.6**	5.1-69.8									14.3	57.1			**28.6**				
	Albany (6)	0.0	**0.0**	0.0-48.3									66.7	33.3							
Quinolones																					
Ciprofloxacin	Hadar (48)	0.0	**0.0**	0.0-9.2	83.3	12.5			4.2												
	Saintpaul (28)	0.0	**0.0**	0.0-15.0	92.9	3.6			3.6												
	Heidelberg (25)	0.0	**0.0**	0.0-16.6	100.0																
	Reading (19)	0.0	**0.0**	0.0-20.9	68.4	31.6															
	Schwarzengrund (14)	0.0	**0.0**	0.0-26.8	100.0																
	IIIa 18:z4,z23:- (11)	0.0	**0.0**	0.0-32.1	100.0																
	Senftenberg (8)	0.0	**0.0**	0.0-40.2	87.5	12.5															
	Agona (7)	0.0	**0.0**	0.0-43.9	100.0																
	Albany (6)	0.0	**0.0**	0.0-48.3	100.0																
Nalidixic Acid	Hadar (48)	0.0	**4.2**	0.7-15.5								8.3	83.3	4.2			**4.2**				
	Saintpaul (28)	0.0	**3.6**	0.2-20.3								10.7	85.7				**3.6**				
	Heidelberg (25)	0.0	**0.0**	0.0-16.6									100.0								
	Reading (19)	0.0	**0.0**	0.0-20.9									89.5	10.5							
	Schwarzengrund (14)	0.0	**0.0**	0.0-26.8								21.4	78.6								
	IIIa 18:z4,z23:- (11)	0.0	**0.0**	0.0-32.1							9.1	72.7	18.2								
	Senftenberg (8)	0.0	**0.0**	0.0-40.2									100.0								
	Agona (7)	0.0	**0.0**	0.0-43.9									100.0								
	Albany (6)	0.0	**0.0**	0.0-48.3								66.7	33.3								
Tetracyclines																					
Tetracycline	Hadar (48)	0.0	**95.8**	84.5-99.3									4.2			**8.3**	**87.5**				
	Saintpaul (28)	0.0	**42.9**	25.1-62.6									57.1				**42.9**				
	Heidelberg (25)	0.0	**64.0**	42.6-81.3									36.0				**64.0**				
	Reading (19)	0.0	**15.8**	4.2-40.5									84.2				**15.8**				
	Schwarzengrund (14)	7.1	**57.1**	29.6-81.2									35.7	7.1		**14.3**	**42.9**				
	IIIa 18:z4,z23:- (11)	0.0	**0.0**	0.0-32.1									100.0								
	Senftenberg (8)	0.0	**37.5**	10.2-74.1									62.5			**12.5**	**25.0**				
	Agona (7)	0.0	**57.1**	20.2-88.2									42.9				**57.1**				
	Albany (6)	0.0	**0.0**	0.0-48.3									100.0								

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 7a. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Cattle, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	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
					Distribution (%) of MICs (µg/ml)[4]																
Aminoglycosides																					
Amikacin	Montevideo (43)	0.0	**0.0**	0.0-10.2							58.1	39.5	2.3								
	Newport (27)	0.0	**0.0**	0.0-15.5						18.5	70.4	11.1									
	Muenster (24)	0.0	**0.0**	0.0-17.2						4.2	62.5	33.3									
	Anatum (21)	0.0	**0.0**	0.0-19.2						28.6	61.9	9.5									
	Typhimurium var. 5- (17)	0.0	**0.0**	0.0-22.9						17.6	64.7	17.6									
	Typhimurium (17)	0.0	**0.0**	0.0-22.9							76.5	23.5									
	Mbandaka (15)	0.0	**0.0**	0.0-25.3							26.7	53.3	6.7	13.3							
	Agona (15)	0.0	**0.0**	0.0-25.3						13.3	73.3	13.3									
	Dublin (13)	0.0	**0.0**	0.0-28.3						30.8	53.8	15.4									
	Cerro (12)	0.0	**0.0**	0.0-30.1						16.7	66.7	8.3	8.3								
	Reading (12)	0.0	**0.0**	0.0-30.1						25.0	75.0										
Gentamicin	Montevideo (43)	0.0	**0.0**	0.0-10.2					46.5	51.2	2.3										
	Newport (27)	0.0	**0.0**	0.0-15.5					63.0	37.0											
	Muenster (24)	0.0	**0.0**	0.0-17.2					75.0	20.8	4.2										
	Anatum (21)	0.0	**0.0**	0.0-19.2					81.0	19.0											
	Typhimurium var. 5- (17)	0.0	**0.0**	0.0-22.9					58.8	41.2											
	Typhimurium (17)	0.0	**0.0**	0.0-22.9					70.6	23.5	5.9										
	Mbandaka (15)	0.0	**0.0**	0.0-25.3					53.3	46.7											
	Agona (15)	0.0	**0.0**	0.0-25.3					20.0	73.3		6.7									
	Dublin (13)	0.0	**38.5**	15.2-67.8					53.8	7.7					**15.4**	**23.1**					
	Cerro (12)	0.0	**0.0**	0.0-30.1					75.0	25.0											
	Reading (12)	0.0	**25.0**	6.7-57.2					75.0							**25.0**					
Kanamycin	Montevideo (43)	0.0	**0.0**	0.0-10.2										100.0							
	Newport (27)	0.0	**14.8**	4.8-34.6										85.2				**14.8**			
	Muenster (24)	0.0	**4.2**	0.2-23.2										87.5	8.3			**4.2**			
	Anatum (21)	0.0	**0.0**	0.0-19.2										100.0							
	Typhimurium var. 5- (17)	0.0	**5.9**	0.3-30.8										94.1				**5.9**			
	Typhimurium (17)	0.0	**70.6**	44.1-88.6										29.4				**70.6**			
	Mbandaka (15)	0.0	**53.3**	27.4-77.7										46.7				**53.3**			
	Agona (15)	0.0	**0.0**	0.0-25.3										100.0							
	Dublin (13)	0.0	**53.8**	26.1-79.6										46.2			**7.7**	**46.2**			
	Cerro (12)	0.0	**0.0**	0.0-30.1										100.0							
	Reading (12)	0.0	**16.7**	3.0-49.2										83.3				**16.7**			
Streptomycin	Montevideo (43)	0.0	**2.3**	0.1-13.8												97.7	**2.3**				
	Newport (27)	0.0	**81.5**	61.3-93.0												18.5		**81.5**			
	Muenster (24)	0.0	**4.2**	0.2-23.2												95.8		**4.2**			
	Anatum (21)	0.0	**0.0**	0.0-19.2												100.0					
	Typhimurium var. 5- (17)	0.0	**35.3**	15.3-61.4												64.7	**5.9**	**29.4**			
	Typhimurium (17)	0.0	**76.5**	49.8-92.2												23.5	**17.6**	**58.8**			
	Mbandaka (15)	0.0	**53.3**	27.4-77.7												46.7		**53.3**			
	Agona (15)	0.0	**6.7**	0.4-34.0												93.3	**6.7**				
	Dublin (13)	0.0	**38.5**	15.2-67.8												61.5		**38.5**			
	Cerro (12)	0.0	**0.0**	0.0-30.1												100.0					
	Reading (12)	0.0	**66.7**	35.5-88.7												33.3		**66.7**			

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 t shaded area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 7b. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Cattle, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	95% CI[3]	Distribution (%) of MICs (µg/ml)[4] 0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Aminopenicillins																					
Ampicillin	Montevideo (43)	0.0	**0.0**	0.0-10.2							81.4	18.6									
	Newport (27)	0.0	**85.2**	65.4-95.2							14.8						**85.2**				
	Muenster (24)	0.0	**4.2**	0.2-23.2							83.3	12.5					**4.2**				
	Anatum (21)	0.0	**0.0**	0.0-19.2							85.7	14.3									
	Typhimurium var. 5- (17)	0.0	**52.9**	28.5-76.1							29.4	17.6					**52.9**				
	Typhimurium (17)	0.0	**94.1**	69.2-99.7							5.9						**94.1**				
	Mbandaka (15)	0.0	**53.3**	27.4-77.7							40.0	6.7					**53.3**				
	Agona (15)	0.0	**0.0**	0.0-25.3							80.0	20.0									
	Dublin (13)	0.0	**76.9**	46.0-93.8							15.4	7.7					**76.9**				
	Cerro (12)	0.0	**0.0**	0.0-30.1							75.0	16.7	8.3								
	Reading (12)	0.0	**66.7**	35.5-88.7							25.0	8.3					**66.7**				
β-Lactam/β-Lactamase Inhibitor Combinations																					
Amoxicillin-Clavulanic Acid	Montevideo (43)	0.0	**0.0**	0.0-10.2							95.3	4.7									
	Newport (27)	0.0	**81.5**	61.3-93.0							14.8			3.7		**3.7**	**77.8**				
	Muenster (24)	0.0	**4.2**	0.2-23.2							95.8					**4.2**					
	Anatum (21)	0.0	**0.0**	0.0-19.2							100.0										
	Typhimurium var. 5- (17)	17.6	**35.3**	15.3-61.4							47.1				17.6		**35.3**				
	Typhimurium (17)	5.9	**35.3**	15.3-61.4							5.9			52.9	5.9		**35.3**				
	Mbandaka (15)	0.0	**53.3**	27.4-77.7							46.7						**53.3**				
	Agona (15)	0.0	**0.0**	0.0-25.3							93.3	6.7									
	Dublin (13)	7.7	**46.2**	20.4-73.9							15.4	7.7		23.1	7.7		**46.2**				
	Cerro (12)	0.0	**0.0**	0.0-30.1							91.7	8.3									
	Reading (12)	0.0	**66.7**	35.5-88.7							33.3					**16.7**	**50.0**				
Cephalosporins																					
Ceftiofur	Montevideo (43)	0.0	**0.0**	0.0-10.2						86.0	14.0										
	Newport (27)	0.0	**81.5**	61.3-93.0						18.5					**81.5**						
	Muenster (24)	0.0	**8.3**	1.4-28.4						37.5	54.2			**4.2**	**4.2**						
	Anatum (21)	0.0	**0.0**	0.0-19.2						66.7	33.3										
	Typhimurium var. 5- (17)	0.0	**35.3**	15.3-61.4						52.9	11.8				**35.3**						
	Typhimurium (17)	0.0	**35.3**	15.3-61.4						52.9	11.8				**35.3**						
	Mbandaka (15)	0.0	**53.3**	27.4-77.7						20.0	26.7				**53.3**						
	Agona (15)	0.0	**0.0**	0.0-25.3						33.3	60.0	6.7									
	Dublin (13)	0.0	**46.2**	20.4-73.9				7.7	7.7	15.4	23.1			**15.4**	**30.8**						
	Cerro (12)	0.0	**0.0**	0.0-30.1						75.0	25.0										
	Reading (12)	0.0	**66.7**	35.5-88.7						33.3					**66.7**						
Ceftriaxone	Montevideo (43)	0.0	**0.0**	0.0-10.2					100.0												
	Newport (27)	59.3	**14.8**	4.8-34.6					18.5					7.4	37.0	22.2	**11.1**	**3.7**			
	Muenster (24)	0.0	**0.0**	0.0-17.2					95.8		4.2										
	Anatum (21)	0.0	**0.0**	0.0-19.2					100.0												
	Typhimurium var. 5- (17)	29.4	**0.0**	0.0-22.9					64.7					5.9	23.5	5.9					
	Typhimurium (17)	35.3	**0.0**	0.0-22.9					64.7						17.6	17.6					
	Mbandaka (15)	46.7	**6.7**	0.4-34.0					46.7						13.3	33.3		**6.7**			
	Agona (15)	0.0	**0.0**	0.0-25.3					100.0												
	Dublin (13)	15.4	**15.4**	2.7-46.4					53.8				7.7	7.7		15.4	**7.7**	**7.7**			
	Cerro (12)	0.0	**0.0**	0.0-30.1					100.0												
	Reading (12)	33.3	**0.0**	0.0-30.1					33.3					33.3	25.0	8.3					

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 t shaded area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 7c. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Cattle, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	[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
					Distribution (%) of MICs (µg/ml)[4]																
Cephamycins																					
Cefoxitin	Montevideo (43)	0.0	**0.0**	0.0-10.2							4.7	83.7	11.6								
	Newport (27)	0.0	**81.5**	61.3-93.0							3.7	7.4	3.7	3.7		**37.0**	**44.4**				
	Muenster (24)	0.0	**4.2**	0.2-23.2									95.8			**4.2**					
	Anatum (21)	0.0	**0.0**	0.0-19.2									95.2	4.8							
	Typhimurium var. 5- (17)	0.0	**35.3**	15.3-61.4								64.7				**17.6**	**17.6**				
	Typhimurium (17)	0.0	**35.3**	15.3-61.4								35.3	29.4			**11.8**	**23.5**				
	Mbandaka (15)	0.0	**53.3**	27.4-77.7									46.7				**53.3**				
	Agona (15)	0.0	**0.0**	0.0-25.3									86.7	13.3							
	Dublin (13)	15.4	**30.8**	10.4-61.1							15.4		23.1	15.4	15.4		**30.8**				
	Cerro (12)	0.0	**0.0**	0.0-30.1							16.7	50.0	16.7	16.7							
	Reading (12)	0.0	**66.7**	35.5-88.7								25.0	8.3			**50.0**	**16.7**				
Folate Pathway Inhibitors																					
Sulfonamides	Montevideo (43)	0.0	**0.0**	0.0-10.2											27.9	46.5	23.3	2.3			
	Newport (27)	0.0	**85.2**	65.4-95.2												11.1	3.7			**85.2**	
	Muenster (24)	0.0	**4.2**	0.2-23.2											4.2	50.0	29.2	12.5		**4.2**	
	Anatum (21)	0.0	**0.0**	0.0-19.2											38.1	38.1	19.0	4.8			
	Typhimurium var. 5- (17)	0.0	**52.9**	28.5-76.1											17.6	29.4				**52.9**	
	Typhimurium (17)	0.0	**94.1**	69.2-99.7											5.9					**94.1**	
	Mbandaka (15)	0.0	**53.3**	27.4-77.7											6.7	20.0	20.0			**53.3**	
	Agona (15)	0.0	**0.0**	0.0-25.3											13.3	20.0	33.3	33.3			
	Dublin (13)	0.0	**69.2**	38.9-89.6											30.8					**69.2**	
	Cerro (12)	0.0	**0.0**	0.0-30.1											8.3	58.3	25.0	8.3			
	Reading (12)	0.0	**66.7**	35.5-88.7												33.3				**66.7**	
Trimethoprim-Sulfamethoxazole	Montevideo (43)	0.0	**0**	0.0-10.2				88.4	11.6												
	Newport (27)	0.0	**25.9**	11.9-46.6				33.3	37	3.7				**25.9**							
	Muenster (24)	0.0	**0**	0.0-17.2				87.5	12.5												
	Anatum (21)	0.0	**0**	0.0-19.2				81	19												
	Typhimurium var. 5- (17)	0.0	**5.9**	0.3-30.8				35.3	47.1	11.8				**5.9**							
	Typhimurium (17)	0.0	**5.9**	0.3-30.8				29.4	47.1	11.8	5.9			**5.9**							
	Mbandaka (15)	0.0	**13.3**	2.3-41.6				33.3	26.7	26.7				**13.3**							
	Agona (15)	0.0	**0**	0.0-25.3				86.7	13.3												
	Dublin (13)	0.0	**0**	0.0-28.3				23.1	46.2	15.4	15.4										
	Cerro (12)	0.0	**0**	0.0-30.1				66.7	33.3												
	Reading (12)	0.0	**0**	0.0-30.1				25	58.3	16.7											

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 t shaded area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 7d. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Cattle, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	[95% CI][3]	Distribution (%) of MICs (μg/ml)[4]																
					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	Montevideo (43)	2.3	**0.0**	0.0-10.2									14.0	83.7	2.3						
	Newport (27)	0.0	**81.5**	61.3-93.0									14.8	3.7			**81.5**				
	Muenster (24)	0.0	**4.2**	0.2-23.2									20.8	75.0			**4.2**				
	Anatum (21)	9.5	**0.0**	0.0-19.2									33.3	57.1	9.5						
	Typhimurium var. 5- (17)	0.0	**47.1**	23.9-71.5									35.3	17.6			**47.1**				
	Typhimurium (17)	0.0	**47.1**	23.9-71.5									17.6	35.3			**47.1**				
	Mbandaka (15)	6.7	**53.3**	27.4-77.7									6.7	33.3	6.7		**53.3**				
	Agona (15)	0.0	**0.0**	0.0-25.3									20.0	80.0							
	Dublin (13)	7.7	**53.8**	26.1-79.6								23.1		15.4	7.7	**7.7**	**46.2**				
	Cerro (12)	8.3	**0.0**	0.0-30.1									50.0	41.7	8.3						
	Reading (12)	0.0	**66.7**	35.5-88.7									8.3	25.0			**66.7**				
Quinolones																					
Ciprofloxacin	Montevideo (43)	0.0	**0.0**	0.0-10.2	90.7	9.3															
	Newport (27)	0.0	**0.0**	0.0-15.5	100.0																
	Muenster (24)	0.0	**0.0**	0.0-17.2	100.0																
	Anatum (21)	0.0	**0.0**	0.0-19.2	100.0																
	Typhimurium var. 5- (17)	0.0	**0.0**	0.0-22.9	100.0																
	Typhimurium (17)	0.0	**0.0**	0.0-22.9	88.2	11.8															
	Mbandaka (15)	0.0	**0.0**	0.0-25.3	93.3	6.7															
	Agona (15)	0.0	**0.0**	0.0-25.3	100.0																
	Dublin (13)	0.0	**0.0**	0.0-28.3	61.5	23.1		7.7	7.7												
	Cerro (12)	0.0	**0.0**	0.0-30.1	100.0																
	Reading (12)	0.0	**0.0**	0.0-30.1	75.0	16.7			8.3												
Nalidixic Acid	Montevideo (43)	0.0	**0.0**	0.0-10.2								23.3	76.7								
	Newport (27)	0.0	**0.0**	0.0-15.5								37.0	63.0								
	Muenster (24)	0.0	**0.0**	0.0-17.2								4.2	95.8								
	Anatum (21)	0.0	**0.0**	0.0-19.2									100.0								
	Typhimurium var. 5- (17)	0.0	**0.0**	0.0-22.9								5.9	94.1								
	Typhimurium (17)	0.0	**0.0**	0.0-22.9								23.5	70.6		5.9						
	Mbandaka (15)	0.0	**0.0**	0.0-25.3									100.0								
	Agona (15)	0.0	**0.0**	0.0-25.3								46.7	53.3								
	Dublin (13)	0.0	**15.4**	2.7-46.4							7.7	30.8	46.2				**15.4**				
	Cerro (12)	0.0	**0.0**	0.0-30.1								25.0	75.0								
	Reading (12)	0.0	**8.3**	0.4-40.2									91.7				**8.3**				
Tetracyclines																					
Tetracycline	Montevideo (43)	0.0	**9.3**	3.0-23.1									90.7				**9.3**				
	Newport (27)	0.0	**81.5**	61.3-93.0									18.5				**81.5**				
	Muenster (24)	4.2	**4.2**	0.2-23.2									91.7	4.2		**4.2**					
	Anatum (21)	0.0	**28.6**	12.2-52.3									71.4			**14.3**	**14.3**				
	Typhimurium var. 5- (17)	0.0	**52.9**	28.5-76.1									47.1			**17.6**	**35.3**				
	Typhimurium (17)	0.0	**82.4**	55.9-95.4									17.6			**17.6**	**64.7**				
	Mbandaka (15)	0.0	**66.7**	38.7-87.0									33.3				**66.7**				
	Agona (15)	0.0	**6.7**	0.4-34.0									93.3		**6.7**						
	Dublin (13)	0.0	**69.2**	38.9-89.6									30.8			**15.4**	**53.8**				
	Cerro (12)	0.0	**8.3**	0.4-40.2									91.7		**8.3**						
	Reading (12)	0.0	**91.7**	59.8-99.6									8.3			**16.7**	**75.0**				

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 t shaded area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 8a. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Swine, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	95% CI[3]	Distribution (%) of MICs (µg/ml)[4] 0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Aminoglycosides																					
Amikacin	Derby (85)	0.0	**0.0**	0.0-5.4						1.2	65.9	30.6	2.4								
	Typhimurium var. 5- (36)	0.0	**0.0**	0.0-12.0						2.8	75.0	16.7	5.6								
	Infantis (27)	0.0	**0.0**	0.0-15.5						40.7	48.1	7.4	3.7								
	Anatum (16)	0.0	**0.0**	0.0-24.1						43.8	56.2										
	Johannesburg (15)	0.0	**0.0**	0.0-25.3						6.7	86.7	6.7									
	Saintpaul (11)	0.0	**0.0**	0.0-32.1						9.1	90.9										
	Reading (11)	0.0	**0.0**	0.0-32.1						36.4	45.5	18.2									
	London (11)	0.0	**0.0**	0.0-32.1						18.2	81.8										
	Adelaide (10)	0.0	**0.0**	0.0-34.5						40.0	50.0	10.0									
	Heidelberg (8)	0.0	**0.0**	0.0-40.2							62.5	37.5									
Gentamicin	Derby (85)	0.0	**2.4**	0.4-9.1					43.5	49.4	4.7				**2.4**						
	Typhimurium var. 5- (36)	0.0	**5.6**	1.0-20.1					66.7	27.8					**5.6**						
	Infantis (27)	0.0	**3.7**	0.2-20.9					77.8	11.1	3.7		3.7		**3.7**						
	Anatum (16)	0.0	**0.0**	0.0-24.1					81.2	12.5	6.2										
	Johannesburg (15)	0.0	**0.0**	0.0-25.3					86.7	13.3											
	Saintpaul (11)	0.0	**0.0**	0.0-32.1					90.9	9.1											
	Reading (11)	0.0	**18.2**	3.2-52.3					72.7	9.1					**9.1**	**9.1**					
	London (11)	0.0	**0.0**	0.0-32.1					100.0												
	Adelaide (10)	0.0	**0.0**	0.0-34.5					100.0												
	Heidelberg (8)	0.0	**0.0**	0.0-40.2					50.0	50.0											
Kanamycin	Derby (85)	0.0	**0.0**	0.0-5.4										100.0							
	Typhimurium var. 5- (36)	0.0	**2.8**	0.1-16.2										97.2				**2.8**			
	Infantis (27)	0.0	**0.0**	0.0-15.5										100.0							
	Anatum (16)	0.0	**0.0**	0.0-24.1										100.0							
	Johannesburg (15)	0.0	**0.0**	0.0-25.3										100.0							
	Saintpaul (11)	0.0	**0.0**	0.0-32.1										100.0							
	Reading (11)	0.0	**0.0**	0.0-32.1										100.0							
	London (11)	0.0	**0.0**	0.0-32.1										100.0							
	Adelaide (10)	0.0	**0.0**	0.0-34.5										100.0							
	Heidelberg (8)	0.0	**75.0**	35.6-95.5										25.0				**75.0**			
Streptomycin	Derby (85)	0.0	**61.2**	50.0-71.4												38.8	**1.2**	**60.0**			
	Typhimurium var. 5- (36)	0.0	**66.7**	49.0-80.9												33.3	**47.2**	**19.4**			
	Infantis (27)	0.0	**11.1**	2.9-30.3												88.9	**11.1**				
	Anatum (16)	0.0	**12.5**	2.2-39.6												87.5	**6.2**	**6.2**			
	Johannesburg (15)	0.0	**0.0**	0.0-25.3												100.0					
	Saintpaul (11)	0.0	**0.0**	0.0-32.1												100.0					
	Reading (11)	0.0	**18.2**	3.2-52.3												81.8		**18.2**			
	London (11)	0.0	**0.0**	0.0-32.1												100.0					
	Adelaide (10)	0.0	**0.0**	0.0-34.5												100.0					
	Heidelberg (8)	0.0	**87.5**	46.7-99.3												12.5	**75.0**	**12.5**			

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 8b. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Swine, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	[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
					Distribution (%) of MICs (µg/ml)[4]																
Aminopenicillins																					
Ampicillin	Derby (85)	0.0	**1.2**	0.1-7.3							82.4	16.5					**1.2**				
	Typhimurium var. 5- (36)	0.0	**66.7**	49.0-80.9							16.7	16.7					**66.7**				
	Infantis (27)	0.0	**0.0**	0.0-15.5							81.5	18.5									
	Anatum (16)	0.0	**0.0**	0.0-24.1							75.0	25.0									
	Johannesburg (15)	0.0	**6.7**	0.4-34.0							86.7	6.7					**6.7**				
	Saintpaul (11)	0.0	**0.0**	0.0-32.1							81.8	18.2									
	Reading (11)	0.0	**27.3**	7.3-60.7							63.6	9.1					**27.3**				
	London (11)	0.0	**0.0**	0.0-32.1							81.8	18.2									
	Adelaide (10)	0.0	**0.0**	0.0-34.5							100.0										
	Heidelberg (8)	0.0	**12.5**	0.7-53.3							62.5	25.0					**12.5**				
β-Lactam/β-Lactamase Inhibitor Combinations																					
Amoxicillin-Clavulanic Acid	Derby (85)	1.2	**0.0**	0.0-5.4							96.5	2.4			1.2						
	Typhimurium var. 5- (36)	50.0	**11.1**	3.6-27.0							25.0	8.3		5.6	50.0	**2.8**	**8.3**				
	Infantis (27)	0.0	**0.0**	0.0-15.5							100.0										
	Anatum (16)	0.0	**0.0**	0.0-24.1							100.0										
	Johannesburg (15)	0.0	**6.7**	0.4-34.0							93.3						**6.7**				
	Saintpaul (11)	0.0	**0.0**	0.0-32.1							100.0										
	Reading (11)	0.0	**27.3**	7.3-60.7							63.6	9.1					**27.3**				
	London (11)	0.0	**0.0**	0.0-32.1							90.9	9.1									
	Adelaide (10)	0.0	**0.0**	0.0-34.5							100.0										
	Heidelberg (8)	0.0	**0.0**	0.0-40.2							87.5			12.5							
Cephalosporins																					
Ceftiofur	Derby (85)	0.0	**0.0**	0.0-5.4						55.3	44.7										
	Typhimurium var. 5- (36)	0.0	**5.6**	1.0-20.1						61.1	33.3				**5.6**						
	Infantis (27)	0.0	**0.0**	0.0-15.5						29.6	70.4										
	Anatum (16)	0.0	**0.0**	0.0-24.1						50.0	50.0										
	Johannesburg (15)	0.0	**6.7**	0.4-34.0						86.7	6.7				**6.7**						
	Saintpaul (11)	0.0	**0.0**	0.0-32.1						90.9	9.1										
	Reading (11)	0.0	**27.3**	7.3-60.7						63.6	9.1				**27.3**						
	London (11)	0.0	**0.0**	0.0-32.1				9.1		63.6	27.3										
	Adelaide (10)	0.0	**0.0**	0.0-34.5						70.0	30.0										
	Heidelberg (8)	0.0	**0.0**	0.0-40.2						87.5	12.5										
Ceftriaxone	Derby (85)	0.0	**0.0**	0.0-5.4					100.0												
	Typhimurium var. 5- (36)	2.8	**0.0**	0.0-12.0					94.4					2.8	2.8						
	Infantis (27)	0.0	**0.0**	0.0-15.5					100.0												
	Anatum (16)	0.0	**0.0**	0.0-24.1					100.0												
	Johannesburg (15)	6.7	**0.0**	0.0-25.3					93.3						6.7						
	Saintpaul (11)	0.0	**0.0**	0.0-32.1					100.0												
	Reading (11)	18.2	**0.0**	0.0-32.1					72.7					9.1	18.2						
	London (11)	0.0	**0.0**	0.0-32.1					100.0												
	Adelaide (10)	0.0	**0.0**	0.0-34.5					100.0												
	Heidelberg (8)	0.0	**0.0**	0.0-40.2					100.0												

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 8c. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Swine, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	[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
									Distribution (%) of MICs (µg/ml)[4]												
Cephamycins																					
Cefoxitin	Derby (85)	0.0	**0.0**	0.0-5.4									96.5	3.5							
	Typhimurium var. 5- (36)	2.8	**5.6**	1.0-20.1								69.4	19.4	2.8	2.8	**2.8**	**2.8**				
	Infantis (27)	3.7	**0.0**	0.0-15.5									96.3		3.7						
	Anatum (16)	0.0	**0.0**	0.0-24.1									87.5	12.5							
	Johannesburg (15)	0.0	**6.7**	0.4-34.0								86.7	6.7			**6.7**					
	Saintpaul (11)	0.0	**0.0**	0.0-32.1							27.3	72.7									
	Reading (11)	0.0	**27.3**	7.3-60.7							18.2	36.4	18.2			**27.3**					
	London (11)	0.0	**0.0**	0.0-32.1						9.1		72.7	9.1	9.1							
	Adelaide (10)	0.0	**0.0**	0.0-34.5									90.0	10.0							
	Heidelberg (8)	0.0	**0.0**	0.0-40.2								62.5	37.5								
Folate Pathway Inhibitors																					
Sulfonamides	Derby (85)	0.0	**60.0**	48.8-70.3											10.6	23.5	5.9			**60.0**	
	Typhimurium var. 5- (36)	0.0	**66.7**	49.0-80.9											16.7	13.9	2.8			**66.7**	
	Infantis (27)	0.0	**3.7**	0.2-20.9											33.3	29.6	29.6	3.7		**3.7**	
	Anatum (16)	0.0	**0.0**	0.0-24.1											56.2	25.0	12.5		6.2		
	Johannesburg (15)	0.0	**0.0**	0.0-25.3											73.3	26.7					
	Saintpaul (11)	0.0	**0.0**	0.0-32.1											63.6	27.3	9.1				
	Reading (11)	0.0	**18.2**	3.2-52.3											63.6	18.2				**18.2**	
	London (11)	0.0	**0.0**	0.0-32.1											100.0						
	Adelaide (10)	0.0	**0.0**	0.0-34.5											90.0	10.0					
	Heidelberg (8)	0.0	**12.5**	0.7-53.3											25.0	25.0	37.5			**12.5**	
Trimethoprim-Sulfamethoxazole	Derby (85)	0.0	**0.0**	0.0-5.4				45.9	42.4	11.8											
	Typhimurium var. 5- (36)	0.0	**11.1**	3.6-27.0				30.6	52.8	5.6				**11.1**							
	Infantis (27)	0.0	**0.0**	0.0-15.5				81.5	18.5												
	Anatum (16)	0.0	**0.0**	0.0-24.1				68.8	31.2												
	Johannesburg (15)	0.0	**0.0**	0.0-25.3				60.0	40.0												
	Saintpaul (11)	0.0	**0.0**	0.0-32.1				81.8	18.2												
	Reading (11)	0.0	**0.0**	0.0-32.1				63.6	36.4												
	London (11)	0.0	**0.0**	0.0-32.1				90.9	9.1												
	Adelaide (10)	0.0	**0.0**	0.0-34.5				100.0													
	Heidelberg (8)	0.0	**0.0**	0.0-40.2				62.5	37.5												

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 8d. Distribution of MICs and Occurrence of Resistance by Top Serotypes Tested from Swine, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	[95% CI][3]	Distribution (%) of MICs (µg/ml)[4] 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	Derby (85)	5.9	**1.2**	0.1-7.3									9.4	83.5	5.9		**1.2**				
	Typhimurium var. 5- (36)	5.6	**58.3**	40.9-74.0									8.3	27.8	5.6		**58.3**				
	Infantis (27)	3.7	**0.0**	0.0-15.5									14.8	81.5	3.7						
	Anatum (16)	0.0	**0.0**	0.0-24.1									6.2	93.8							
	Johannesburg (15)	0.0	**0.0**	0.0-25.3									26.7	73.3							
	Saintpaul (11)	0.0	**0.0**	0.0-32.1								18.2	54.5	27.3							
	Reading (11)	0.0	**18.2**	3.2-52.3									27.3	54.5			**18.2**				
	London (11)	9.1	**0.0**	0.0-32.1									36.4	54.5	9.1						
	Adelaide (10)	0.0	**0.0**	0.0-34.5									20.0	80.0							
	Heidelberg (8)	0.0	**0.0**	0.0-40.2									12.5	87.5							
Quinolones																					
Ciprofloxacin	Derby (85)	0.0	**0.0**	0.0-5.4	98.8				1.2												
	Typhimurium var. 5- (36)	0.0	**0.0**	0.0-12.0	83.3	16.7															
	Infantis (27)	0.0	**0.0**	0.0-15.5	100.0																
	Anatum (16)	0.0	**0.0**	0.0-24.1	81.2	18.8															
	Johannesburg (15)	0.0	**0.0**	0.0-25.3	86.7	13.3															
	Saintpaul (11)	0.0	**0.0**	0.0-32.1	100.0																
	Reading (11)	0.0	**0.0**	0.0-32.1	81.8	18.2															
	London (11)	0.0	**0.0**	0.0-32.1	90.9	9.1															
	Adelaide (10)	0.0	**0.0**	0.0-34.5	100.0																
	Heidelberg (8)	0.0	**0.0**	0.0-40.2	100.0																
Nalidixic Acid	Derby (85)	0.0	**1.2**	0.1-7.3								25.9	72.9				**1.2**				
	Typhimurium var. 5- (36)	0.0	**0.0**	0.0-12.0								5.6	80.6	13.9							
	Infantis (27)	0.0	**0.0**	0.0-15.5								22.2	77.8								
	Anatum (16)	0.0	**0.0**	0.0-24.1									100.0								
	Johannesburg (15)	0.0	**0.0**	0.0-25.3								20.0	80.0								
	Saintpaul (11)	0.0	**0.0**	0.0-32.1								54.5	45.5								
	Reading (11)	0.0	**0.0**	0.0-32.1								18.2	72.7	9.1							
	London (11)	0.0	**0.0**	0.0-32.1							9.1		90.9								
	Adelaide (10)	0.0	**0.0**	0.0-34.5								10.0	90.0								
	Heidelberg (8)	0.0	**0.0**	0.0-40.2									100.0								
Tetracyclines																					
Tetracycline	Derby (85)	1.2	**69.4**	58.3-78.7									29.4	1.2			**69.4**				
	Typhimurium var. 5- (36)	0.0	**83.3**	66.5-93.0									16.7			**50.0**	**33.3**				
	Infantis (27)	3.7	**3.7**	0.2-20.9									92.6	3.7			**3.7**				
	Anatum (16)	0.0	**93.8**	67.8-99.7									6.2			**50.0**	**43.8**				
	Johannesburg (15)	0.0	**66.7**	38.7-87.0									33.3				**66.7**				
	Saintpaul (11)	0.0	**18.2**	3.2-52.3									81.8				**18.2**				
	Reading (11)	9.1	**63.6**	31.6-87.6									27.3	9.1		**27.3**	**36.4**				
	London (11)	0.0	**0.0**	0.0-32.1									100.0								
	Adelaide (10)	0.0	**0.0**	0.0-34.5									100.0								
	Heidelberg (8)	0.0	**87.5**	46.7-99.3									12.5				**87.5**				

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 9a. Distribution of MICs and Occurrence of Resistance by Animal Source among all *S.* Typhimurium Isolates from Food Animals, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	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
					Distribution (%) of MICs (µg/ml)[4]																
Aminoglycosides																					
Amikacin	Chickens (183)	0.0	**0.0**	0.0-2.6						20.8	64.5	13.7	1.1								
	Turkeys (7)	0.0	**0.0**	0.0-43.9							100.0										
	Cattle (34)	0.0	**0.0**	0.0-12.6						8.8	70.6	20.6									
	Swine (42)	0.0	**0.0**	0.0-10.4						4.8	76.2	14.3	4.8								
Gentamicin	Chickens (183)	1.1	**4.4**	2.1-8.8					66.1	26.8	1.1		0.5	1.1	**3.3**	**1.1**					
	Turkeys (7)	0.0	**14.3**	0.8-58.0					42.9	42.9					**14.3**						
	Cattle (34)	0.0	**0.0**	0.0-12.6					64.7	32.4	2.9										
	Swine (42)	0.0	**7.1**	1.8-20.5					69.0	23.8					**7.1**						
Kanamycin	Chickens (183)	0.0	**7.7**	4.4-12.8										92.3				**7.7**			
	Turkeys (7)	0.0	**0.0**	0.0-43.9										100.0							
	Cattle (34)	0.0	**38.2**	22.7-56.3										61.8				**38.2**			
	Swine (42)	0.0	**7.1**	1.8-20.5										92.9				**7.1**			
Streptomycin	Chickens (183)	0.0	**13.7**	9.2-19.7												86.3	**9.8**	**3.8**			
	Turkeys (7)	0.0	**57.1**	20.2-88.2												42.9	**28.6**	**28.6**			
	Cattle (34)	0.0	**55.9**	38.1-72.4												44.1	**11.8**	**44.1**			
	Swine (42)	0.0	**69.0**	52.7-81.8												31.0	**45.2**	**23.8**			
Aminopenicillins																					
Ampicillin	Chickens (183)	0.0	**26.8**	20.7-33.9							59.6	13.1	0.5				**26.8**				
	Turkeys (7)	0.0	**57.1**	20.2-88.2							42.9						**57.1**				
	Cattle (34)	0.0	**73.5**	55.3-86.5							17.6	8.8					**73.5**				
	Swine (42)	0.0	**66.7**	50.4-80.0							14.3	16.7	2.4				**66.7**				
β-Lactam/β-Lactamase Inhibitor Combinations																					
Amoxicillin-Clavulanic Acid	Chickens (183)	6.0	**19.7**	14.3-26.4							71.0	2.2		1.1	6.0		**19.7**				
	Turkeys (7)	42.9	**0.0**	0.0-43.9							42.9			14.3	42.9						
	Cattle (34)	11.8	**35.3**	20.3-53.5							26.5			26.5	11.8		**35.3**				
	Swine (42)	47.6	**9.5**	3.1-23.5							21.4	11.9	2.4	7.1	47.6	**2.4**	**7.1**				
Cephalosporins																					
Ceftiofur	Chickens (183)	0.0	**19.7**	14.3-26.4				1.1		71.0	8.2			**1.1**	**18.6**						
	Turkeys (7)	0.0	**0.0**	0.0-43.9						71.4	28.6										
	Cattle (34)	0.0	**35.3**	20.3-53.5						52.9	11.8				**35.3**						
	Swine (42)	0.0	**4.8**	0.8-17.5						64.3	31.0				**4.8**						
Ceftriaxone	Chickens (183)	18.6	**0.0**	0.0-2.6					79.8	0.5				1.1	16.4	2.2					
	Turkeys (7)	0.0	**0.0**	0.0-43.9					100.0												
	Cattle (34)	32.4	**0.0**	0.0-12.6					64.7					2.9	20.6	11.8					
	Swine (42)	2.4	**0.0**	0.0-10.4					95.2					2.4	2.4						

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 th 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. CLSI breakpoints were streptomycin.

Table 9b. Distribution of MICs and Occurrence of Resistance by Animal Source among all *S.* Typhimurium Isolates from Food Animals, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	[95% CI][3]	Distribution (%) of MICs (µg/ml)[4]																
					0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Cephamycins																					
Cefoxitin	Chickens (183)	0.0	**19.7**	14.3-26.4							1.6	63.9	14.2	0.5		**10.9**	**8.7**				
	Turkeys (7)	0.0	**0.0**	0.0-43.9								100.0									
	Cattle (34)	0.0	**35.3**	20.3-53.5								50.0	14.7			**14.7**	**20.6**				
	Swine (42)	2.4	**4.8**	0.8-17.5								69.0	19.0	4.8	2.4	**2.4**	**2.4**				
Folate Pathway Inhibitors																					
Sulfonamides	Chickens (183)	0.0	**37.2**	30.3-44.7											26.8	32.2	3.8			**37.2**	
	Turkeys (7)	0.0	**57.1**	20.2-88.2											14.3	14.3	14.3			**57.1**	
	Cattle (34)	0.0	**73.5**	55.3-86.5											11.8	14.7				**73.5**	
	Swine (42)	0.0	**69.0**	52.7-81.8											16.7	11.9	2.4			**69.0**	
Trimethoprim-Sulfamethoxazole	Chickens (183)	0.0	**0.0**	0.0-2.6				61.2	35.5	2.7	0.5										
	Turkeys (7)	0.0	**0.0**	0.0-43.9				71.4	28.6												
	Cattle (34)	0.0	**5.9**	1.0-21.1				32.4	47.1	11.8	2.9			**5.9**							
	Swine (42)	0.0	**9.5**	3.1-23.5				31.0	50.0	7.1	2.4			**9.5**							
Phenicols																					
Chloramphenicol	Chickens (183)	0.0	**8.2**	4.8-13.4								1.1	33.3	57.4			**8.2**				
	Turkeys (7)	0.0	**57.1**	20.2-88.2									14.3	28.6			**57.1**				
	Cattle (34)	0.0	**47.1**	30.2-64.6									26.5	26.5			**47.1**				
	Swine (42)	4.8	**54.8**	38.9-69.9									9.5	31.0	4.8		**54.8**				
Quinolones																					
Ciprofloxacin	Chickens (183)	0.0	**0.0**	0.0-2.6	94.5	4.4	0.5		0.5												
	Turkeys (7)	0.0	**0.0**	0.0-43.9	100.0																
	Cattle (34)	0.0	**0.0**	0.0-12.6	94.1	5.9															
	Swine (42)	0.0	**0.0**	0.0-10.4	81.0	19.0															
Nalidixic Acid	Chickens (183)	0.0	**1.1**	0.2-4.3								10.4	88.0		0.5		**1.1**				
	Turkeys (7)	0.0	**0.0**	0.0-43.9									100.0								
	Cattle (34)	0.0	**0.0**	0.0-12.6								14.7	82.4		2.9						
	Swine (42)	0.0	**0.0**	0.0-10.4								4.8	81.0	14.3							
Tetracyclines																					
Tetracycline	Chickens (183)	0.0	**34.4**	27.6-41.8									65.6		**1.1**	**6.0**	**27.3**				
	Turkeys (7)	0.0	**57.1**	20.2-88.2									42.9			**42.9**	**14.3**				
	Cattle (34)	0.0	**67.6**	49.3-82.0									32.4			**17.6**	**50.0**				
	Swine (42)	0.0	**83.3**	68.0-92.5									16.7			**47.6**	**35.7**				

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 th 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. CLSI breakpoints were streptomycin.

Table 10a. Antimicrobial Resistance among *Salmonella* Typhimurium[a] Isolates from Food Animals, by Year, 1997-2005

Year			1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested		Chickens	24	66	154	145	130	150	156	171	183
		Turkeys	11	6	37	18	15	9	6	14	7
		Cattle	2	33	189	187	87	98	78	48	34
		Swine	25	105	114	81	44	48	27	53	42
Antimicrobial Class	**Antimicrobial**	**Isolate Source**									
Aminoglycosides	Amikacin	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
		Turkeys	0.0% 0	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% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
		Swine	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
	Gentamicin	Chickens	20.8% 5	18.2% 12	16.9% 26	15.2% 22	3.1% 4	12.7% 19	5.1% 8	4.1% 7	4.4% 8
		Turkeys	45.5% 5	50.0% 3	29.7% 11	33.3% 6	53.3% 8	44.4% 4	83.3% 5	64.3% 9	14.3% 1
		Cattle	0.0% 0	3.0% 1	2.6% 5	1.6% 3	0.0% 0	2.0% 2	1.3% 1	0.0% 0	0.0% 0
		Swine	0.0% 0	0.0% 0	1.8% 2	0.0% 0	2.3% 1	2.1% 1	0.0% 0	3.8% 2	7.1% 3
	Kanamycin	Chickens	8.3% 2	4.5% 3	3.9% 6	3.4% 5	3.1% 4	5.3% 8	7.7% 12	9.9% 17	7.7% 14
		Turkeys	81.8% 9	66.7% 4	59.5% 22	44.4% 8	73.3% 11	55.6% 5	50.0% 3	21.4% 3	0.0% 0
		Cattle	0.0% 0	54.5% 18	36.5% 69	27.3% 51	24.1% 21	26.5% 26	16.7% 13	14.6% 7	38.2% 13
		Swine	16.0% 4	18.1% 19	21.1% 24	14.8% 12	13.6% 6	2.1% 1	0.0% 0	9.4% 5	7.1% 3
	Streptomycin	Chickens	41.7% 10	45.5% 30	40.9% 63	35.9% 52	16.9% 22	30.0% 45	16.7% 26	8.2% 14	13.7% 25
		Turkeys	81.8% 9	83.3% 5	81.1% 30	72.2% 13	93.3% 14	77.8% 7	100.0% 6	64.3% 9	57.1% 4
		Cattle	100.0% 2	57.6% 19	63.0% 119	63.1% 118	46.0% 40	66.3% 65	52.6% 41	56.2% 27	55.9% 19
		Swine	44.0% 11	82.9% 87	80.7% 92	77.8% 63	70.5% 31	77.1% 37	59.3% 16	77.4% 41	69.0% 29
Aminopenicillins	Ampicillin	Chickens	33.3% 8	30.3% 20	43.5% 67	42.1% 61	26.2% 34	45.3% 68	32.1% 50	46.8% 80	26.8% 49
		Turkeys	72.7% 8	50.0% 3	64.9% 24	66.7% 12	80.0% 12	55.6% 5	66.7% 4	28.6% 4	57.1% 4
		Cattle	100.0% 2	57.6% 19	66.1% 125	63.1% 118	57.5% 50	71.4% 70	59.0% 46	60.4% 29	73.5% 25
		Swine	72.0% 18	75.2% 79	64.0% 73	82.7% 67	63.6% 28	62.5% 30	51.9% 14	71.7% 38	66.7% 28

[a] Typhimurium and Typhimurium var. 5- isolates combined

Table 10b. Antimicrobial Resistance among *Salmonella* Typhimurium Isolates from Food Animals, by Year, 1997-2005

Year			1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested		Chickens	24	66	154	145	130	150	156	171	183
		Turkeys	11	6	37	18	15	9	6	14	7
		Cattle	2	33	189	187	87	98	78	48	34
		Swine	25	105	114	81	44	48	27	53	42
Antimicrobial Class	**Antimicrobial**	**Isolate Source**									
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin-Clavulanic Acid	Chickens	0.0% 0	9.1% 6	29.2% 45	25.5% 37	14.6% 19	28.7% 43	25.6% 40	43.3% 74	19.7% 36
		Turkeys	63.6% 7	0.0% 0	51.4% 19	38.9% 7	53.3% 8	22.2% 2	16.7% 1	14.3% 2	0.0% 0
		Cattle	50.0% 1	6.1% 2	6.9% 13	12.8% 24	13.8% 12	17.3% 17	20.5% 16	25.0% 12	35.3% 12
		Swine	0.0% 0	1.9% 2	1.8% 2	2.5% 2	4.5% 2	8.3% 4	0.0% 0	0.0% 0	9.5% 4
Cephalosporins	Ceftiofur	Chickens	0.0% 0	9.1% 6	29.9% 46	26.2% 38	14.60% 19	28.0% 42	25.6% 40	43.3% 74	19.7% 36
		Turkeys	63.6% 7	0.0% 0	48.6% 18	38.9% 7	53.3% 8	22.2% 2	16.7% 1	14.3% 2	0.0% 0
		Cattle	0.0% 0	3.0% 1	6.9% 13	11.8% 22	11.5% 10	15.3% 15	20.5% 16	25.0% 12	35.3% 12
		Swine	0.0% 0	0.0% 0	1.8% 2	0.0% 0	0.0% 0	4.2% 2	0.0% 0	1.9% 1	4.8% 2
	Ceftriaxone	Chickens	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	1.3% 2	0.0% 0	1.8% 3	0.0% 0
		Turkeys	0.0% 0	0.0% 0	8.1% 3	11.1% 2	6.7% 1	0.0% 0	16.7% 1	0.0% 0	0.0% 0
		Cattle	0.0% 0	0.0% 0	0.5% 1	0.0% 0	0.0% 0	0.0% 0	0.0% 0	2.1% 1	0.0% 0
		Swine	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
	Cephalothin	Chickens	0.0% 0	9.1% 6	29.9% 46	25.5% 37	13.8% 18	28.0% 42	25.6% 40		
		Turkeys	63.6% 7	50.0% 3	51.4% 19	38.9% 7	60.0% 9	22.2% 2	33.3% 2		
		Cattle	0.0% 0	3.0% 1	13.2% 25	12.8% 24	12.6% 11	16.3% 16	21.8% 17		
		Swine	0.0% 0	0.0% 0	0.9% 1	2.5% 2	0.0% 0	4.2% 2	0.0% 0		
Cephamycins	Cefoxitin	Chickens				24.8% 36	14.6% 19	26.7% 40	23.7% 37	43.3% 74	19.7% 36
		Turkeys				38.9% 7	53.3% 8	22.2% 2	16.7% 1	14.3% 2	0.0% 0
		Cattle				9.1% 17	11.5% 10	11.2% 11	16.7% 13	25.0% 12	35.3% 12
		Swine				12.1% 1	0.0% 0	4.2% 2	3.7% 1	0.0% 0	4.8% 2

[a] Typhimurium and Typhimurium var. 5- isolates combined

Table 10c. Antimicrobial Resistance among *Salmonella* Typhimurium Isolates from Food Animals, by Year, 1997-2005

Year			1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested		Chickens	24	66	154	145	130	150	156	171	183
		Turkeys	11	6	37	18	15	9	6	14	7
		Cattle	2	33	189	187	87	98	78	48	34
		Swine	25	105	114	81	44	48	27	53	42
Antimicrobial Class	**Antimicrobial**	**Isolate Source**									
Folate Pathway Inhibitors	Sulfonamides	Chickens	41.7% 10	37.9% 25	32.5% 50	34.5% 50	18.5% 24	31.3% 47	28.2% 44	47.4% 81	37.2% 68
		Turkeys	81.8% 9	83.3% 5	75.7% 28	66.7% 12	86.7% 13	77.8% 7	100.0% 6	78.6% 11	57.1% 4
		Cattle	100.0% 2	60.6% 20	64.6% 122	64.2% 120	54.0% 47	58.2% 57	44.9% 35	60.4% 29	73.5% 25
		Swine	80.0% 20	83.8% 88	78.9% 90	86.4% 70	75.0% 33	68.8% 33	63.0% 17	81.1% 43	69.0% 29
	Trimethoprim-Sulfamethoxazole	Chickens	0.0% 0	1.5% 1	1.3% 2	0.0% 0	0.8% 1	13.0% 2	0.6% 1	0.0% 0	37.2% 0
		Turkeys	0.0% 0	0.0% 0	0.0% 0	11.1% 2	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
		Cattle	0.0% 0	6.1% 2	9.0% 17	2.1% 4	2.3% 2	4.1% 4	2.6% 2	4.2% 2	5.9% 2
		Swine	4.0% 1	0.0% 0	0.0% 0	0.0% 0	0.0% 0	2.1% 1	3.7% 1	1.9% 1	9.5% 4
Phenicols	Chloramphenicol	Chickens	20.8% 5	19.7% 13	10.4% 16	14.5% 21	11.5% 15	16.0% 24	5.1% 8	1.8% 3	37.2% 15
		Turkeys	63.6% 7	0.0% 0	54.1% 20	55.6% 10	73.3% 11	66.7% 6	50.0% 3	28.6% 4	57.1% 4
		Cattle	100.0% 2	27.3% 9	37.0% 70	42.8% 80	37.9% 33	49.0% 48	42.3% 33	54.2% 26	47.1% 16
		Swine	52.0% 13	57.1% 60	49.1% 56	53.1% 43	47.7% 21	56.3% 27	48.1% 13	60.4% 32	54.8% 23
Quinolones	Ciprofloxacin	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
		Turkeys	0.0% 0	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% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
		Swine	0.0% 0	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	Chickens	0.0% 0	0.0% 0	6.0% 1	7.0% 1	0.0% 0	2.7% 4	0.0% 0	0.0% 0	37.2% 2
		Turkeys	45.5% 5	0.0% 0	51.4% 19	33.3% 6	60.0% 9	55.6% 5	33.3% 2	14.3% 2	0.0% 0
		Cattle	0.0% 0	0.0% 0	0.5% 1	0.0% 0	0.0% 0	1.0% 1	0.0% 0	6.2% 3	0.0% 0
		Swine	0.0% 0	0.0% 0	0.0% 0	1.2% 1	0.0% 0	2.1% 1	0.0% 0	0.0% 0	0.0% 0
Tetracyclines	Tetracycline	Chickens	33.3% 8	31.8% 21	32.5% 50	32.4% 47	16.2% 21	28.0% 42	33.3% 52	44.4% 76	37.2% 63
		Turkeys	90.9% 10	83.3% 5	78.4% 29	83.3% 15	93.3% 14	77.8% 7	100.0% 6	78.6% 11	57.1% 4
		Cattle	100.0% 2	63.6% 21	58.7% 111	61.5% 115	44.8% 39	64.3% 63	53.8% 42	60.4% 29	67.6% 23
		Swine	84.0% 21	89.5% 94	84.2% 96	91.1% 73	79.5% 35	89.6% 43	74.1% 20	90.6% 48	83.3% 35

[a] Typhimurium and Typhimurium var. 5- isolates combined

Table 11a. Distribution of MICs and Occurrence of Resistance by Animal Source among all *S.* Enteritidis Isolates from Food Animals, 2005

Antimicrobial	Isolate Source (# of Isolates)[1]	%I[2]	%R[3]	[95% CI][4]	Distribution (%) of MICs (µg/ml)[5] 0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Aminoglycosides																					
Amikacin	Chickens (173)	0.0	**0.0**	0.0-2.7						38.2	54.3	6.9	0.6								
	Cattle (2)	0.0	**0.0**	0.0-80.2							100.0										
Gentamicin	Chickens (173)	0.0	**0.0**	0.0-2.7					90.8	9.2											
	Cattle (2)	0.0	**0.0**	0.0-80.2					100.0												
Kanamycin	Chickens (173)	0.0	**0.0**	0.0-2.7										100.0							
	Cattle (2)	0.0	**0.0**	0.0-80.2										100.0							
Streptomycin	Chickens (173)	0.0	**0.6**	0-3.7												99.4	**0.6**				
	Cattle (2)	0.0	**0.0**	0.0-80.2												100.0					
Aminopenicillins																					
Ampicillin	Chickens (173)	0.6	**1.2**	0.2-4.6							67.1	29.5	1.7		0.6	**0.6**	**0.6**				
	Cattle (2)	0.0	**0.0**	0.0-80.2							100.0										
β-Lactam/β-Lactamase Inhibitor Combinations																					
Amoxicillin-Clavulanic Acid	Chickens (173)	0.0	**0.6**	0-3.7							96.0	2.9		0.6		**0.6**					
	Cattle (2)	0.0	**0.0**	0.0-80.2							100.0										
Cephalosporins																					
Ceftiofur	Chickens (173)	1.2	**1.2**	0.2-4.6						61.3	35.3	1.2	1.2	**0.6**	**0.6**						
	Cattle (2)	0.0	**0.0**	0.0-80.2							100.0										
Ceftriaxone	Chickens (173)	0.0	**0.0**	0.0-2.7					98.3	0.6	0.6			0.6							
	Cattle (2)	0.0	**0.0**	0.0-80.2					100.0												

[1] There were no *Salmonella* Enteritidis isolates from turkeys and swine

[2] Percent of isolates with intermediate susceptibility

[3] Percent of isolates that were resistant

[4] 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

[5] 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. Numbe 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. CLSI bre breakpoints for streptomycin.

Table 11b. Distribution of MICs and Occurrence of Resistance by Animal Source among all *S*. Enteritidis Isolates from Food Animals, 2005

Antimicrobial	Isolate Source (# of Isolates)[1]	%I[2]	%R[3]	[95% CI][4]	Distribution (%) of MICs (µg/ml)[5] 0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Cephamycins																					
Cefoxitin	Chickens (173)	0.0	**0.6**	0-3.7							3.5	78.6	13.9	3.5		**0.6**					
	Cattle (2)	0.0	**0.0**	0.0-80.2								50.0	50.0								
Folate Pathway Inhibitors																					
Sulfonamides	Chickens (173)	0.0	**0.0**	0.0-2.7											20.8	61.8	17.3				
	Cattle (2)	0.0	**0.0**	0.0-80.2											50.0		50.0				
Trimethoprim-Sulfamethoxazole	Chickens (173)	0.0	**0.0**	0.0-2.7				75.7	24.3												
	Cattle (2)	0.0	**0.0**	0.0-80.2				100.0													
Phenicols																					
Chloramphenicol	Chickens (173)	0.6	**0.6**	0-3.7									37.6	61.3	0.6	**0.6**					
	Cattle (2)	0.0	**0.0**	0.0-80.2									50.0	50.0							
Quinolones																					
Ciprofloxacin	Chickens (173)	0.0	**0.0**	0.0-2.7	82.7	16.8			0.6												
	Cattle (2)	0.0	**0.0**	0.0-80.2	50.0	50.0															
Nalidixic Acid	Chickens (173)	0.0	**0.6**	0-3.7								5.8	85.0	8.7		**0.6**					
	Cattle (2)	0.0	**0.0**	0.0-80.2									####								
Tetracyclines																					
Tetracycline	Chickens (173)	1.2	**0.6**	0-3.7									98.3	1.2			**0.6**				
	Cattle (2)	0.0	**0.0**	0.0-80.2									####								

[1] There were no *Salmonella* Enteritidis isolates from turkeys and swine

[2] Percent of isolates with intermediate susceptibility

[3] Percent of isolates that were resistant

[4] 95% confidence intervals for percent resistant (%R) were calculated using the Clopper-Pearson exact method

[5] 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. Numbe
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. CLSI brea
breakpoints for streptomycin.

Table 12a. Antimicrobial Resistance among *Salmonella* Enteritidis Isolates from Food Animals, by Year, 1997-2005

Year			1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested		Chickens	1	13	41	31	21	48	42	84	173
		Turkeys	0	0	1	1	0	0	0	0	0
		Cattle	1	1	8	4	4	6	3	2	2
		Swine	0	0	2	1	1	1	1	1	0
Antimicrobial Class	**Antimicrobial**	**Isolate Source**									
Aminoglycosides	Amikacin	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
		Turkeys			0.0% 0	0.0% 0					
		Cattle	0.0% 0	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			0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	
	Gentamicin	Chickens	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	1.2% 1	0.0% 0
		Turkeys			0.0% 0	0.0% 0					
		Cattle	0.0% 0	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			0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	
	Kanamycin	Chickens	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	2.1% 1	0.0% 0	0.0% 0	0.0% 0
		Turkeys			0.0% 0	0.0% 0					
		Cattle	0.0% 0	0.0% 0	12.5% 1	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	100.0% 1	0.0% 0	0.0% 0	0.0% 0	
	Streptomycin	Chickens	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	2.1% 1	0.0% 0	1.2% 1	0.6% 1
		Turkeys			0.0% 0	0.0% 0					
		Cattle	0.0% 0	0.0% 0	12.5% 1	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	100.0% 1	0.0% 0	0.0% 0	0.0% 0	
Aminopenicillins	Ampicillin	Chickens	100.0% 1	30.8% 4	12.2% 5	9.7% 3	0.0% 0	4.2% 2	0.0% 0	1.2% 1	1.2% 2
		Turkeys			0.0% 0	0.0% 0					
		Cattle	0.0% 0	100.0% 1	12.5% 1	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	100.0% 1	0.0% 0	0.0% 0	0.0% 0	

Table 12b. Antimicrobial Resistance among *Salmonella* Enteritidis Isolates from Food Animals, by Year, 1997-2005

Year			1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested		Chickens	1	13	41	31	21	48	42	84	173
		Turkeys	0	0	1	1	0	0	0	0	0
		Cattle	1	1	8	4	4	6	3	2	2
		Swine	0	0	2	1	1	1	1	1	0
Antimicrobial Class	**Antimicrobial**	**Isolate Source**									
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin-Clavulanic Acid	Chickens	0.0% 0	0.0% 0	2.4% 1	3.2% 1	0.0% 0	4.2% 2	0.0% 0	1.2% 1	0.6% 1
		Turkeys			0.0% 0	0.0% 0					
		Cattle	0.0% 0	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			0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	
Cephalosporins	Ceftiofur	Chickens	0.0% 0	0.0% 0	4.9% 2	3.2% 1	0.0% 0	4.2% 2	0.0% 0	1.2% 1	1.2% 2
		Turkeys			0.0% 0	0.0% 0					
		Cattle	0.0% 0	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			0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	
	Ceftriaxone	Chickens	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	2.1% 1	0.0% 0	0.0% 0	0.0% 0
		Turkeys			0.0% 0	0.0% 0					
		Cattle	0.0% 0	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			0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	
	Cephalothin	Chickens	0.0%	7.7% 1	4.9% 2	0.0% 0	0.0% 0	4.2% 2	0.0% 0		
		Turkeys			0.0% 0	0.0% 0					
		Cattle	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	0.0% 0	0.0% 0		
Cephamycins	Cefoxitin	Chickens				0.0% 0	0.0% 0	2.1% 1	0.0% 0	1.2% 1	0.6% 1
		Turkeys				0.0% 0					
		Cattle				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	0.0% 0	0.0% 0	

Table 12c. Antimicrobial Resistance among *Salmonella* Enteritidis Isolates from Food Animals, by Year, 1997-2005

Year			1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested		Chickens	1	13	41	31	21	48	42	84	173
		Turkeys	0	0	1	1	0	0	0	0	0
		Cattle	1	1	8	4	4	6	3	2	2
		Swine	0	0	2	1	1	1	1	1	0
Antimicrobial Class	**Antimicrobial**	**Isolate Source**									
Folate Pathway Inhibitors	Sulfonamides	Chickens	0.0% 0	0.0% 0	4.9% 2	3.2% 1	0.0% 0	4.2% 2	2.4% 1	1.2% 1	0.0% 0
		Turkeys			0.0% 0	0.0% 0					
		Cattle	0.0% 0	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			0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	
	Trimethoprim-Sulfamethoxazole	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
		Turkeys			0.0% 0	0.0% 0					
		Cattle	0.0% 0	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			0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	
Phenicols	Chloramphenicol	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	0.6% 1
		Turkeys			0.0% 0	0.0% 0					
		Cattle	0.0% 0	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			0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	
Quinolones	Ciprofloxacin	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
		Turkeys			0.0% 0	0.0% 0					
		Cattle	0.0% 0	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			0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	
	Nalidixic Acid	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	0.6% 1
		Turkeys			0.0% 0	0.0% 0					
		Cattle	0.0% 0	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			0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	
Tetracyclines	Tetracycline	Chickens	0.0% 0	0.0% 0	7.3% 3	0.0% 0	0.0% 0	2.1% 1	2.4% 1	2.4% 2	0.6% 1
		Turkeys			0.0% 0	0.0% 0					
		Cattle	0.0% 0	100.0% 1	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	100.0% 1	0.0% 0	0.0% 0	0.0% 0	

Table13a. Distribution of MICs and Occurrence of Resistance by Animal Source among all *S.* Heidelberg Isolates from Food Animals, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	95% CI[3]	Distribution (%) of MICs (µg/ml)[4]																
					0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Aminoglycosides																					
Amikacin	Chickens (283)	0.0	**0.0**	0.0-1.7						27.9	61.5	10.2	0.4								
	Turkeys (25)	0.0	**0.0**	0.0-16.6						40.0	52.0	8.0									
	Cattle (6)	0.0	**0.0**	0.0-48.3						16.7	66.7	16.7									
	Swine (8)	0.0	**0.0**	0.0-40.2							62.5	37.5									
Gentamicin	Chickens (283)	1.1	**9.2**	6.2-13.3					75.3	13.8			0.7	1.1	**6.0**	**3.2**					
	Turkeys (25)	4.0	**36.0**	18.7-57.4					60.0					4.0	**20.0**	**16.0**					
	Cattle (6)	0.0	**0.0**	0.0-48.3					33.3	50.0		16.7									
	Swine (8)	0.0	**0.0**	0.0-40.2					50.0	50.0											
Kanamycin	Chickens (283)	0.0	**6.7**	4.2-10.4										92.9	0.4		**2.5**	**4.2**			
	Turkeys (25)	0.0	**44.0**	25.0-64.7										56.0			**4.0**	**40.0**			
	Cattle (6)	0.0	**50.0**	13.9-86.1										50.0				**50.0**			
	Swine (8)	0.0	**75.0**	35.6-95.5										25.0				**75.0**			
Streptomycin	Chickens (283)	0.0	**15.5**	11.6-20.4												84.5	**7.8**	**7.8**			
	Turkeys (25)	0.0	**44.0**	25.0-64.7												56.0	**24.0**	**20.0**			
	Cattle (6)	0.0	**50.0**	13.9-86.1												50.0		**50.0**			
	Swine (8)	0.0	**87.5**	46.7-99.3												12.5	**75.0**	**12.5**			
Aminopenicillins																					
Ampicillin	Chickens (283)	0.0	**25.1**	20.2-30.6							54.4	19.1	0.7	0.7		**0.4**	**24.7**				
	Turkeys (25)	0.0	**24.0**	10.2-45.5							60.0	12.0	4.0				**24.0**				
	Cattle (6)	0.0	**83.3**	36.5-99.1							16.7						**83.3**				
	Swine (8)	0.0	**12.5**	0.7-53.3							62.5	25.0					**12.5**				
β-Lactam/β-Lactamase Inhibitor Combinations																					
Amoxicillin-Clavulanic Acid	Chickens (283)	2.5	**21.9**	17.3-27.3							73.1	1.1	0.7	0.7	2.5		**21.9**				
	Turkeys (25)	8.0	**0.0**	0.0-16.6							72.0	4.0		16.0	8.0						
	Cattle (6)	0.0	**83.3**	36.5-99.1							16.7						**83.3**				
	Swine (8)	0.0	**0.0**	0.0-40.2							87.5			12.5							
Cephalosporins																					
Ceftiofur	Chickens (283)	0.0	**21.9**	17.3-27.3					0.4	72.8	4.9			**0.7**	**21.2**						
	Turkeys (25)	0.0	**0.0**	0.0-16.6						96.0	4.0										
	Cattle (6)	0.0	**83.3**	36.5-99.1						16.7					**83.3**						
	Swine (8)	0.0	**0.0**	0.0-40.2						87.5	12.5										
Ceftriaxone	Chickens (283)	18.7	**1.4**	0.4-3.8					78.1				0.4	1.4	16.6	2.1	**1.4**				
	Turkeys (25)	0.0	**0.0**	0.0-16.6					100.0												
	Cattle (6)	50.0	**0.0**	0.0-48.3					16.7					33.3	50.0						
	Swine (8)	0.0	**0.0**	0.0-40.2					100.0												

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 13b. Distribution of MICs and Occurrence of Resistance by Animal Source among all *S.* Heidelberg Isolates from Food Animals, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	[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
					Distribution (%) of MICs (µg/ml)[4]																
Cephamycins																					
Cefoxitin	Chickens (283)	0.7	**21.6**	17.0-26.9							11.0	59.4	6.7	0.7	0.7	**15.2**					
	Turkeys (25)	0.0	**0.0**	0.0-16.6							4.0	80.0	16.0								
	Cattle (6)	16.7	**66.7**	24.1-94.0								16.7			16.7	**66.7**					
	Swine (8)	0.0	**0.0**	0.0-40.2								62.5	37.5								
Folate Pathway Inhibitors																					
Sulfonamides	Chickens (283)	0.0	**10.6**	7.4-14.9											67.5	20.8	1.1			**10.6**	
	Turkeys (25)	0.0	**52.0**	31.8-71.7											24.0	24.0				**52.0**	
	Cattle (6)	0.0	**50.0**	13.9-86.1											33.3	16.7				**50.0**	
	Swine (8)	0.0	**12.5**	0.7-53.3											25.0	25.0	37.5			**12.5**	
Trimethoprim-Sulfamethoxazole	Chickens (283)	0.0	**0.4**	0-2.3				73.5	25.1	0.4	0.4	0.4		**0.4**							
	Turkeys (25)	0.0	**0.0**	0.0-16.6				56.0	44.0												
	Cattle (6)	0.0	**50.0**	13.9-86.1				50.0						**50.0**							
	Swine (8)	0.0	**0.0**	0.0-40.2				62.5	37.5												
Phenicols																					
Chloramphenicol	Chickens (283)	1.8	**3.2**	1.6-6.2									23.7	71.4	1.8		**3.2**				
	Turkeys (25)	4.0	**0.0**	0.0-16.6									12.0	84.0	4.0						
	Cattle (6)	0.0	**50.0**	13.9-86.1									33.3	16.7			**50.0**				
	Swine (8)	0.0	**0.0**	0.0-40.2									12.5	87.5							
Quinolones																					
Ciprofloxacin	Chickens (283)	0.0	**0.0**	0.0-1.7	96.5	3.5	100.0														
	Turkeys (25)	0.0	**0.0**	0.0-16.6	100.0																
	Cattle (6)	0.0	**0.0**	0.0-48.3	83.3	16.7															
	Swine (8)	0.0	**0.0**	0.0-40.2	100.0																
Nalidixic Acid	Chickens (283)	0.0	**0.0**	0.0-1.7								2.8	95.8	1.4							
	Turkeys (25)	0.0	**0.0**	0.0-16.6									####								
	Cattle (6)	0.0	**0.0**	0.0-48.3									83.3	16.7							
	Swine (8)	0.0	**0.0**	0.0-40.2									####								
Tetracyclines																					
Tetracycline	Chickens (283)	0.0	**14.5**	10.7-19.3									85.5			**1.4**	**13.1**				
	Turkeys (25)	0.0	**64.0**	42.6-81.3									36.0				**64.0**				
	Cattle (6)	0.0	**66.7**	24.1-94.0									33.3				**66.7**				
	Swine (8)	0.0	**87.5**	46.7-99.3									12.5				**87.5**				

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 14a. Antimicrobial Resistance among *Salmonella* Heidelberg Isolates from Food Animals, by Year, 1997-2005

Year			**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Number of Isolates Tested		Chickens	51	143	297	259	329	403	226	167	283
		Turkeys	14	39	139	125	142	60	57	46	25
		Cattle	1	11	28	6	10	8	9	1	6
		Swine	7	37	33	22	16	11	11	4	8
Antimicrobial Class	**Antimicrobial**	**Isolate Source**									
Aminoglycosides	Amikacin	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
		Turkeys	0.0% 0	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% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
		Swine	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
	Gentamicin	Chickens	41.2% 21	26.6% 38	18.5% 55	32.0% 83	12.5% 41	8.9% 36	7.5% 17	10.2% 17	9.2% 26
		Turkeys	0.0% 0	17.9% 7	16.5% 23	12.0% 15	13.4% 19	18.3% 11	12.3% 7	17.4% 8	36.0% 9
		Cattle	0.0% 0	27.3% 3	39.3% 11	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	9.1% 2	0.0% 0	9.1% 1	0.0% 0	0.0% 0	0.0% 0
	Kanamycin	Chickens	0.0% 0	0.7% 1	1.3% 4	12.0% 31	4.3% 14	3.7% 15	5.3% 12	6.0% 10	6.7% 19
		Turkeys	7.1% 1	5.1% 2	17.3% 24	43.2% 54	31.0% 44	30.0% 18	21.1% 12	19.6% 9	44.0% 11
		Cattle	0.0% 0	63.6% 7	42.9% 12	16.7% 1	10.0% 1	37.5% 3	55.6% 5	100.0% 1	50.0% 3
		Swine	85.7% 6	64.9% 24	60.6% 20	77.3% 17	75.0% 12	54.5% 6	100.0% 11	75.0% 3	75.0% 6
	Streptomycin	Chickens	35.3% 18	32.9% 47	23.9% 71	36.7% 95	20.4% 67	18.6% 75	17.7% 40	18.0% 30	15.5% 44
		Turkeys	14.3% 2	30.8% 12	30.2% 42	52.8% 66	40.1% 57	35.0% 21	28.1% 16	21.7% 10	44.0% 11
		Cattle	0.0% 0	72.7% 8	57.1% 16	16.7% 1	20.0% 2	37.5% 3	55.6% 5	100.0% 1	50.0% 3
		Swine	57.1% 4	81.1% 30	63.6% 21	86.4% 19	75.0% 12	45.5% 5	100.0% 11	75.0% 3	87.5% 7
Aminopenicillins	Ampicillin	Chickens	21.6% 11	25.2% 36	16.2% 48	24.7% 64	16.7% 55	14.9% 60	19.0% 43	16.2% 27	25.1% 71
		Turkeys	7.1% 1	12.8% 5	8.6% 12	4.0% 5	9.2% 13	13.3% 8	3.5% 2	17.4% 8	24.0% 6
		Cattle	0.0% 0	27.3% 3	50.0% 14	0.0% 0	0.0% 0	50.0% 4	55.6% 5	100.0% 1	83.3% 5
		Swine	0.0% 0	5.4% 2	0.0% 0	9.1% 2	0.0% 0	18.2% 2	9.1% 1	0.0% 0	12.5% 1

Table 14b. Antimicrobial Resistance among Salmonella Heidelberg Isolates from Food Animals, by Year, 1997-2005

Year			1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested		Chickens	51	143	297	259	329	403	226	167	283
		Turkeys	14	39	139	125	142	60	57	46	25
		Cattle	1	11	28	6	10	8	9	1	6
		Swine	7	37	33	22	16	11	11	4	8
Antimicrobial Class	**Antimicrobial**	**Isolate Source**									
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin-Clavulanic Acid	Chickens	2.0% 1	1.4% 2	1.3% 4	13.5% 35	7.0% 23	8.7% 35	9.3% 21	10.2% 17	21.9% 62
		Turkeys	0.0% 0	2.6% 1	0.7% 1	2.4% 3	5.6% 8	5.0% 3	0.0% 0	6.5% 3	0.0% 0
		Cattle	0.0% 0	27.3% 3	42.9% 12	0.0% 0	0.0% 0	50.0% 4	55.6% 5	100.0% 1	83.3% 5
		Swine	0.0% 0	0.0% 0	0.0% 0	4.5% 1	0.0% 0	9.1% 1	9.1% 1	0.0% 0	0.0% 0
Cephalosporins	Ceftiofur	Chickens	2.0% 1	1.4% 2	1.7% 5	13.9% 36	5.8% 19	8.9% 36	9.3% 21	10.2% 17	21.9% 62
		Turkeys	0.0% 0	2.6% 1	0.7% 1	3.2% 4	5.6% 8	5.0% 3	0.0% 0	6.5% 3	0.0% 0
		Cattle	0.0% 0	27.3% 3	42.9% 12	0.0% 0	0.0% 0	37.5% 3	55.6% 5	100.0% 1	83.3% 5
		Swine	0.0% 0	0.0% 0	0.0% 0	4.5% 1	0.0% 0	9.1% 1	9.1% 1	0.0% 0	0.0% 0
	Ceftriaxone	Chickens	0.0% 0	≤0.7%[1] ≤1	0.0% 0	0.4% 1	0.0% 0	0.2% 1	0.0% 0	0.6% 1	1.4% 4
		Turkeys	0.0% 0	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% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
		Swine	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
	Cephalothin	Chickens	2.0% 1	9.8% 14	5.7% 17	15.4% 40	8.5% 28	9.9% 40	12.8% 29		
		Turkeys	0.0% 0	5.1% 2	2.2% 3	2.4% 3	7.0% 10	5.0% 3	1.8% 1		
		Cattle	0.0% 0	27.3% 3	42.9% 12	0.0% 0	0.0% 0	50.0% 4	55.6% 5		
		Swine	0.0% 0	0.0% 0	0.0% 0	4.5% 1	0.0% 0	9.1% 1	9.1% 1		
Cephamycins	Cefoxitin	Chickens				13.5% 35	5.2% 17	7.4% 30	7.1% 16	10.2% 17	21.6% 61
		Turkeys				2.4% 3	4.9% 7	1.7% 1	0.0% 0	6.5% 3	0.0% 0
		Cattle				0.0% 0	0.0% 0	37.5% 3	44.4% 4	100.0% 1	66.7% 4
		Swine				4.5% 1	0.0% 0	9.1% 1	9.1% 1	0.0% 0	0.0% 0

[1] In 1998, there was 1 isolate from chickens that grew in all ceftriaxone dilutions on the Sensititre plate (MIC >16 µg/mL). Further testing was not conducted

Table 14c. Antimicrobial Resistance among Salmonella Heidelberg Isolates from Food Animals, by Year, 1997-2005

Year			1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested		Chickens	51	143	297	259	329	403	226	167	283
		Turkeys	14	39	139	125	142	60	57	46	25
		Cattle	1	11	28	6	10	8	9	1	6
		Swine	7	37	33	22	16	11	11	4	8
Antimicrobial Class	**Antimicrobial**	**Isolate Source**									
Folate Pathway Inhibitors	Sulfonamides	Chickens	45.1% 23	33.6% 48	26.6% 79	33.2% 86	16.4% 54	9.7% 39	11.1% 25	12.6% 21	10.6% 30
		Turkeys	50.0% 7	35.9% 14	33.8% 47	15.2% 19	27.5% 39	30.0% 18	19.3% 11	26.1% 12	52.0% 13
		Cattle	0.0% 0	36.4% 4	57.1% 16	0.0% 0	10.0% 1	12.5% 1	44.4% 4	100.0% 1	50.0% 3
		Swine	0.0% 0	21.6% 8	21.2% 7	13.6% 3	0.0% 0	0.0% 0	0.0% 0	0.0% 0	12.5% 1
	Trimethoprim-Sulfamethoxazole	Chickens	0.0% 0	0.7% 1	0.7% 2	0.4% 1	0.3% 1	0.7% 3	0.9% 2	0.0% 0	0.4% 1
		Turkeys	7.1% 1	5.1% 2	4.3% 6	0.8% 1	3.5% 5	3.3% 2	3.5% 2	0.0% 0	0.0% 0
		Cattle	0.0% 0	27.3% 3	42.9% 12	0.0% 0	10.0% 1	0.0% 0	55.6% 5	100.0% 1	50.0% 3
		Swine	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	9.1% 1	0.0% 0	0.0% 0	0.0% 0
Phenicols	Chloramphenicol	Chickens	0.0% 0	0.7% 1	1.3% 4	11.6% 30	3.3% 11	1.7% 7	3.1% 7	4.2% 7	3.2% 9
		Turkeys	0.0% 0	2.6% 1	0.7% 1	1.6% 2	2.8% 4	1.7% 1	0.0% 0	0.0% 0	0.0% 0
		Cattle	0.0% 0	27.3% 3	42.9% 12	0.0% 0	10.0% 1	25.0% 2	44.4% 4	100.0% 1	50.0% 3
		Swine	0.0% 0	0.0% 0	3.0% 1	4.5% 1	0.0% 0	9.1% 1	0.0% 0	0.0% 0	0.0% 0
Quinolones	Ciprofloxacin	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
		Turkeys	0.0% 0	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% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
		Swine	0.0% 0	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	Chickens	0.0% 0	0.0% 0	0.3% 1	0.0% 0	0.0% 0	0.7% 3	0.0% 0	0.0% 0	0.0% 0
		Turkeys	0.0% 0	0.0% 0	0.7% 1	0.8% 1	0.0% 0	1.7% 1	0.0% 0	0.0% 0	0.0% 0
		Cattle	0.0% 0	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	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
Tetracyclines	Tetracycline	Chickens	2.0% 1	7.7% 11	7.7% 23	20.1% 52	14.9% 49	11.7% 47	16.4% 37	15.0% 25	14.5% 41
		Turkeys	14.3% 2	23.1% 9	38.1% 53	64.0% 80	54.2% 77	70.0% 42	84.2% 48	73.9% 34	64.0% 16
		Cattle	0.0% 0	63.6% 7	60.7% 17	33.3% 2	40.0% 4	62.5% 5	55.6% 5	100.0% 1	66.7% 4
		Swine	85.7% 6	73.0% 27	72.7% 24	81.8% 18	93.8% 15	72.7% 8	100.0% 11	75.0% 3	87.5% 7

Table15a. Distribution of MICs and Occurrence of Resistance by Animal Source among all *S.* Newport Isolates from Food Animals, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	95% CI[3]	Distribution (%) of MICs (µg/ml)[4] 0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024
Aminoglycosides																					
Amikacin	Chickens (6)	0.0	**0.0**	0.0-48.3							50.0	33.3	16.7								
	Turkeys (5)	0.0	**0.0**	0.0-53.7						60.0	40.0										
	Cattle (27)	0.0	**0.0**	0.0-15.5						18.5	70.4	11.1									
	Swine (1)	0.0	**0.0**	0.0-94.5							100.0										
Gentamicin	Chickens (6)	0.0	**16.7**	0.9-63.5	6.0				33.3	50.0					**16.7**						
	Turkeys (5)	0.0	**80.0**	29.9-98.9	5.0				20.0						**60.0**	**20.0**					
	Cattle (27)	0.0	**0.0**	0.0-15.5	27.0				63.0	37.0											
	Swine (1)	0.0	**0.0**	0.0-94.5	1.0				100.0												
Kanamycin	Chickens (6)	0.0	**33.3**	6.0-75.9										66.7				**33.3**			
	Turkeys (5)	0.0	**80.0**	29.9-98.9										20.0				**80.0**			
	Cattle (27)	0.0	**14.8**	4.8-34.6										85.2				**14.8**			
	Swine (1)	0.0	**0.0**	0.0-94.5										100.0							
Streptomycin	Chickens (6)	0.0	**50.0**	13.9-86.1												50.0		**50.0**			
	Turkeys (5)	0.0	**80.0**	29.9-98.9												20.0	**40.0**	**40.0**			
	Cattle (27)	0.0	**81.5**	61.3-93.0												18.5		**81.5**			
	Swine (1)	0.0	**0.0**	0.0-94.5												100.0					
Aminopenicillins																					
Ampicillin	Chickens (6)	0.0	**50.0**	13.9-86.1							50.0						**50.0**				
	Turkeys (5)	0.0	**20.0**	1.1-70.1							80.0						**20.0**				
	Cattle (27)	0.0	**85.2**	65.4-95.2							14.8						**85.2**				
	Swine (1)	0.0	**0.0**	0.0-94.5							100.0										
β-Lactam/β-Lactamase Inhibitor Combinations																					
Amoxicillin-Clavulanic Acid	Chickens (6)	0.0	**50.0**	13.9-86.1							33.3	16.7					**50.0**				
	Turkeys (5)	0.0	**0.0**	0.0-53.7							80.0			20.0							
	Cattle (27)	0.0	**81.5**	61.3-93.0							14.8			3.7		**3.7**	**77.8**				
	Swine (1)	0.0	**0.0**	0.0-94.5							100.0										
Cephalosporins																					
Ceftiofur	Chickens (6)	0.0	**50.0**	13.9-86.1						50.0					**50.0**						
	Turkeys (5)	0.0	**0.0**	0.0-53.7						100.0											
	Cattle (27)	0.0	**81.5**	61.3-93.0						18.5					**81.5**						
	Swine (1)	0.0	**0.0**	0.0-94.5						100.0											
Ceftriaxone	Chickens ()	50.0	**0.0**	0.0-48.3					50.0						16.7	33.3					
	Turkeys ()	0.0	**0.0**	0.0-53.7					100.0												
	Cattle ()	59.3	**14.8**	4.8-34.6					18.5					7.4	37.0	22.2	**11.1**	3.7			
	Swine ()	0.0	**0.0**	0.0-94.5					100.0												

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 15b. Distribution of MICs and Occurrence of Resistance by Animal Source among all *S.* Newport Isolates from Food Animals, 2005

Antimicrobial	Isolate Source (# of Isolates)	%I[1]	%R[2]	[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
					Distribution (%) of MICs (µg/ml)[4]																
Cephamycins																					
Cefoxitin	Chickens (6)	0.0	**50.0**	13.9-86.1								33.3	16.7			**16.7**	**33.3**				
	Turkeys (5)	0.0	**0.0**	0.0-53.7								80.0	20.0								
	Cattle (27)	0.0	**81.5**	61.3-93.0							3.7	7.4	3.7	3.7		**37.0**	**44.4**				
	Swine (1)	0.0	**0.0**	0.0-94.5								100.0									
Folate Pathway Inhibitors																					
Sulfonamides	Chickens (6)	0.0	**50.0**	13.9-86.1												33.3	16.7			**50.0**	
	Turkeys (5)	0.0	**80.0**	29.9-98.9												20.0				**80.0**	
	Cattle (27)	0.0	**85.2**	65.4-95.2												11.1	3.7			**85.2**	
	Swine (1)	0.0	**0.0**	0.0-94.5												100.0					
Trimethoprim-Sulfamethoxazole	Chickens (6)	0.0	**16.7**	0.9-63.5				50.0	33.3					**16.7**							
	Turkeys (5)	0.0	**0.0**	0.0-53.7				60.0	40.0												
	Cattle (27)	0.0	**25.9**	11.9-46.6				33.3	37.0	3.7				**25.9**							
	Swine (1)	0.0	**0.0**	0.0-94.5				100.0													
Phenicols																					
Chloramphenicol	Chickens (6)	0.0	**50.0**	13.9-86.1								33.3	16.7			**50.0**					
	Turkeys (5)	0.0	**0.0**	0.0-53.7								60.0	40.0								
	Cattle (27)	0.0	**81.5**	61.3-93.0								14.8	3.7			**81.5**					
	Swine (1)	0.0	**0.0**	0.0-94.5								100.0									
Quinolones																					
Ciprofloxacin	Chickens (6)	0.0	**0.0**	0.0-48.3	100.0																
	Turkeys (5)	0.0	**0.0**	0.0-53.7	100.0																
	Cattle (27)	0.0	**0.0**	0.0-15.5	100.0																
	Swine (1)	0.0	**0.0**	0.0-94.5	100.0																
Nalidixic Acid	Chickens (6)	0.0	**0.0**	0.0-48.3									####								
	Turkeys (5)	0.0	**0.0**	0.0-53.7									80.0	20.0							
	Cattle (27)	0.0	**0.0**	0.0-15.5								37.0	63.0								
	Swine (1)	0.0	**0.0**	0.0-94.5									####								
Tetracyclines																					
Tetracycline	Chickens (6)	0.0	**50.0**	13.9-86.1									50.0				**50.0**				
	Turkeys (5)	0.0	**60.0**	17.0-92.7									40.0				**60.0**				
	Cattle (27)	0.0	**81.5**	61.3-93.0									18.5				**81.5**				
	Swine (1)	0.0	**0.0**	0.0-94.5									####								

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 16a. Antimicrobial Resistance among *Salmonella* Newport Isolates from Food Animals, by Year, 1997-2005

Year			1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested		Chickens	0	1	7	5	8	6	7	0	6
		Turkeys	0	1	4	6	16	10	19	7	5
		Cattle	0	8	54	109	87	113	75	44	27
		Swine	0	1	5	2	7	0	3	0	1
Antimicrobial Class	**Antimicrobial (Resistance Breakpoint)**	**Isolate Source**									
Aminoglycosides	Amikacin	Chickens		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	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% 0	0.0% 0	0.0% 0	0.0% 0
		Swine		0.0% 0	0.0% 0	0.0% 0	0.0% 0		0.0% 0		0.0% 0
	Gentamicin	Chickens		100.0% 1	0.0% 0	20.0% 1	0.0% 0	0.0% 0	0.0% 0		16.7% 1
		Turkeys		0.0% 0	0.0% 0	16.7% 1	6.3% 1	0.0% 0	52.6% 10	14.3% 1	80.0% 4
		Cattle		0.0% 0	1.9% 1	11.0% 12	6.9% 6	7.1% 8	1.3% 1	0.0% 0	0.0% 0
		Swine		0.0% 0	0.0% 0	0.0% 0	0.0% 0		0.0% 0		0.0% 0
	Kanamycin	Chickens		0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0		33.3% 2
		Turkeys		0.0% 0	0.0% 0	0.0% 0	0.0% 0	10.0% 1	21.1% 4	14.3% 1	80.0% 4
		Cattle		0.0% 0	0.0% 0	9.2% 10	6.9% 6	15.9% 18	17.3% 13	25.0% 11	14.8% 4
		Swine		0.0% 0	0.0% 0	0.0% 0	57.1% 4		0.0% 0		0.0% 0
	Streptomycin	Chickens		100.0% 1	0.0% 0	20.0% 1	37.5% 3	0.0% 0	85.7% 6		50.0% 3
		Turkeys		0.0% 0	0.0% 0	16.7% 1	12.5% 2	0.0% 0	31.6% 6	14.3% 1	80.0% 4
		Cattle		12.5% 1	37.0% 20	79.8% 87	73.6% 64	80.5% 91	84.0% 63	84.1% 37	81.5% 22
		Swine		0.0% 0	0.0% 0	50.0% 1	85.7% 6		100.0% 3		0.0% 0
Aminopenicillins	Ampicillin	Chickens		100.0% 1	0.0% 0	0.0% 0	37.5% 3	16.7% 1	85.7% 6		50.0% 3
		Turkeys		0.0% 0	0.0% 0	0.0% 0	12.5% 2	0.0% 0	15.8% 3	28.6% 2	20.0% 1
		Cattle		12.5% 1	37.0% 20	77.1% 84	70.1% 61	78.8% 89	82.7% 62	81.8% 36	85.2% 23
		Swine		0.0% 0	0.0% 0	0.0% 0	85.7% 6		100.0% 3		0.0% 0

Table 16b. Antimicrobial Resistance among Salmonella Newport Isolates from Food Animals, by Year, 1997-2005

Year			**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Number of Isolates Tested		Chickens	0	1	7	5	8	6	7	0	6
		Turkeys	0	1	4	6	16	10	19	7	5
		Cattle	0	8	54	109	87	113	75	44	27
		Swine	0	1	5	2	7	0	3	0	1
Antimicrobial Class	**Antimicrobial (Resistance Breakpoint)**	**Isolate Source**									
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin-Clavulanic Acid	Chickens		0.0% 0	0.0% 0	0.0% 0	37.5% 3	0.0% 0	85.7% 6		50.0% 3
		Turkeys		0.0% 0	0.0% 0	0.0% 0	12.5% 2	0.0% 0	10.5% 2	14.3% 1	0.0% 0
		Cattle		12.5% 1	37.0% 20	76.1% 83	69.0% 60	78.8% 89	81.3% 61	77.4% 34	81.5% 22
		Swine		0.0% 0	0.0% 0	0.0% 0	85.7% 6		100.0% 3		0.0% 0
Cephalosporins	Ceftiofur	Chickens		0.0% 0	0.0% 0	0.0% 0	37.5% 3	0.0% 0	85.7% 6		50.0% 3
		Turkeys		0.0% 0	0.0% 0	0.0% 0	12.5% 2	0.0% 0	10.5% 2	14.3% 1	0.0% 0
		Cattle		12.5% 1	37.0% 20	76.1% 83	69.0% 60	78.8% 89	81.3% 61	77.3% 34	81.5% 22
		Swine		0.0% 0	0.0% 0	0.0% 0	85.7% 6		100.0% 3		0.0% 0
	Ceftriaxone	Chickens		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	0.0% 0	0.0% 0	0.0% 0	0.0% 0
		Cattle		0.0% 0	0.0% 0	0.9% 1	1.1% 1	0.9% 1	1.3% 1	11.4% 5	14.8% 4
		Swine		0.0% 0	0.0% 0	0.0% 0	0.0% 0		0.0% 0		0.0% 0
	Cephalothin	Chickens		0.0% 0	0.0% 0	0.0% 0	37.5% 3	0.0% 0	85.7% 6		
		Turkeys		0.0% 0	0.0% 0	0.0% 0	12.5% 2	0.0% 0	10.5% 2		
		Cattle		12.5% 1	37.0% 20	74.3% 81	69.0% 60	78.8% 89	81.3% 61		
		Swine		0.0% 0	0.0% 0	0.0% 0	85.7% 6		100.0% 3		
Cephamycins	Cefoxitin	Chickens				0.0% 0	37.5% 3	0.0% 0	71.4% 5		50.0% 3
		Turkeys				0.0% 0	12.5% 2	0.0% 0	10.5% 2	14.3% 1	0.0% 0
		Cattle				73.4% 80	66.7% 58	77.9% 88	74.7% 56	77.3% 34	81.5% 22
		Swine				0.0% 0	85.7% 6		100.0% 3		0.0% 0

Table 16c. Antimicrobial Resistance among Salmonella Newport Isolates from Food Animals, by Year, 1997-2005

Year			1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested		Chickens	0	1	7	5	8	6	7	0	6
		Turkeys	0	1	4	6	16	10	19	7	5
		Cattle	0	8	54	109	87	113	75	44	27
		Swine	0	1	5	2	7	0	3	0	1
Antimicrobial Class	**Antimicrobial (Resistance Breakpoint)**	**Isolate Source**									
Folate Pathway Inhibitors	Sulfonamides	Chickens		100.0% 1	0.0% 0	0.0% 0	37.5% 3	0.0% 0	71.4% 5		50.0% 3
		Turkeys		0.0% 0	0.0% 0	16.7% 1	12.5% 2	0.0% 0	52.6% 10	14.3% 1	80.0% 4
		Cattle		12.5% 1	35.2% 19	73.4% 80	72.4% 63	74.3% 84	73.3% 55	84.1% 37	85.2% 23
		Swine		0.0% 0	0.0% 0	50.0% 1	85.7% 6		100.0% 3		0.0% 0
	Trimethoprim-Sulfamethoxazole	Chickens		0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0		16.7% 1
		Turkeys		0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	14.3% 1	0.0% 0
		Cattle		0.0% 0	1.9% 1	14.7% 16	12.6% 11	7.1% 8	0.0% 0	2.3% 1	25.9% 7
		Swine		0.0% 0	0.0% 0	0.0% 0	0.0% 0		33.3% 1		0.0% 0
Phenicols	Chloramphenicol	Chickens		0.0% 0	0.0% 0	0.0% 0	37.5% 3	0.0% 0	85.7% 6		50.0% 3
		Turkeys		0.0% 0	0.0% 0	0.0% 0	12.5% 2	0.0% 0	21.1% 4	14.3% 1	0.0% 0
		Cattle		12.5% 1	37.0% 20	78.9% 86	73.6% 64	77.9% 88	78.7% 59	77.3% 34	81.5% 22
		Swine		0.0% 0	0.0% 0	50.0% 1	85.7% 6		100.0% 3		0.0% 0
Quinolones	Ciprofloxacin	Chickens		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	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% 0	0.0% 0	0.0% 0	0.0% 0
		Swine		0.0% 0	0.0% 0	0.0% 0	0.0% 0		0.0% 0		0.0% 0
	Nalidixic Acid	Chickens		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	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% 0	1.3% 1	0.0% 0	0.0% 0
		Swine		0.0% 0	0.0% 0	0.0% 0	0.0% 0		0.0% 0		0.0% 0
Tetracyclines	Tetracycline	Chickens		100.0% 1	0.0% 0	0.0% 0	37.5% 3	0.0% 0	85.7% 6		50.0% 3
		Turkeys		0.0% 0	0.0% 0	0.0% 0	12.5% 2	40.0% 4	36.8% 7	28.6% 2	60.0% 3
		Cattle		12.5% 1	38.9% 21	80.7% 88	73.6% 64	80.5% 91	84.0% 63	84.1% 37	81.5% 22
		Swine		100.0% 1	20.0% 1	50.0% 1	85.7% 6		100.0% 3		0.0% 0

Table 17. *S* . Typhimurium from Food Animals with ACSSuT or ACSuT resistance pattern, 2005

	Typhimurium	Percent of		Typhimurium var 5-[a]	Percent of		Total	Percent of	
		Typh n=112	Total n=2864		Typh var 5- n=155	Total n=2864		All Typhimurium n=540	Total n=2864
No. of Isolates	112	100.0	3.9	155	100.0	5.4	267	100.0	9.3
A C S Su T (penta-resistant)	16	14.3	0.6	36	23.2	1.3	52	19.5	1.8
A C Su T (quadra-resistant)	2	1.8	0.1	3	1.9	0.1	5	1.9	0.2
Total	**18**	16.1	0.6	**39**	25.2	1.4	**57**	21.3	2.0

Table 18. *S.* Typhimurium from Food Animals that were DT104 or DT104 complex isolates, 2005

	Typhimurium	Percent of		Typhimurium var 5-[a]	Percent of		Total	Percent of	
		Typh n=112	Total n=2864		Typh var 5- n=155	Total n=2864		All Typhimurium n=540	Total n=2864
A C S Su T (penta-resistant)[b]									
DT104	7	6.3	0.2	12	7.7	0.4	19	7.1	0.7
DT104A	0	0.0	0.0	2	1.3	0.1	2	0.7	0.1
DT104B	1	0.9	0.0	0	0.0	0.0	1	0.4	0.0
Total	**8**	**7.1**	**0.3**	**14**	**9.0**	**0.5**	**22**	**8.2**	**0.8**

[b]Only 1 *S* . Typhimurium ACSuT resistant isolate was confirmed DT104

Table 19. Phage types other than DT104 for *S.* Typhimurium from Food Animals within ACSSuT or ACSuT resistance patterns, 2005

	Typhimurium	Percent of		Typhimurium var 5-[a]	Percent of		Total	Percent of	
		Typh n=112	Total n=2864		Typh var 5- n=155	Total n=2442		All Typhimurium n=540	Total n=2864
A C S Su T (penta-resistant)[b]									
DT108	1	0.9	0.0	0	0.0	0.0	1	0.4	0.0
DT120	0	0.0	0.0	1	0.6	0.0	1	0.4	0.0
DT193	2	1.8	0.1	0	0.0	0.0	2	0.7	0.1
DT208	0	0.0	0.0	1	0.6	0.0	1	0.4	0.0
RDNC	1	0.9	0.0	0	0.0	0.0	1	0.4	0.0
U302	0	0.0	0.0	6	3.9	0.2	6	2.2	0.2
Untypable	0	0.0	0.0	8	5.2	0.3	8	3.0	0.3
Total	**4**	3.6	0.1	**16**	10.3	0.6	**20**	7.5	0.7

Table 20. Confirmed *S.* Typhimurium DT104[1,2] Isolates from Food Animals, 1997-2005

Year	Chicken			Turkey			Cattle			Swine		
	n	% (S.Typhimurium)	% (Chicken)	n	% (S.Typhimurium)	% (Turkey)	n	% (S.Typhimurium)	% (Cattle)	n	% (S.Typhimurium)	% (Swine)
1997	4	16.7	1.9	0	0.0	0.0	1	50.0	4.2	11	44.0	9.9
1998	11	16.7	2.0	0	0.0	0.0	2	6.1	0.7	48	45.7	6.1
1999	12	7.8	0.8	2	5.4	0.3	37	19.6	2.3	34	29.8	3.9
2000	18	12.4	1.5	3	16.7	0.6	46	24.6	3.3	25	30.9	5.5
2001	14	10.8	1.1	2	13.3	0.4	20	23.0	2.2	15	34.1	3.6
2002	16	10.7	1.1	1	11.1	0.4	21	21.4	2.1	13	27.1	3.4
2003	4	2.6	0.3	1	16.7	0.4	10	12.8	1.5	8	29.6	3.8
2004	3	1.8	0.2	0	0.0	0.0	14	29.2	2.3	11	20.8	3.6
2005	9	4.9	0.5	2	28.6	0.9	7	20.6	2.1	12	28.6	4.0

[1] Includes isolates that are DT104 complex (A or B)

[2] Includes *S.* Typhimurium and *S* .Typhimurium var. 5-

Table 21. Resistance Patterns of *Salmonella* from Chickens, by Year, 1997-2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested	214	561	1438	1173	1307	1500	1158	1280	1989
Resistance Pattern									
No Resistance detected	52.8% 113	58.6% 329	58.8% 846	56.9% 667	66.5% 869	62.0% 930	61.1% 708	62.7% 803	61.2% 1217
Resistance >1 CLSI subclass[1]	47.2% 101	41.4% 232	41.2% 592	43.1% 506	33.5% 438	38.0% 570	38.9% 450	37.3% 477	38.8% 772
Resistance >2 CLSI subclasses[1]	28.0% 60	32.3% 181	32.3% 465	32.5% 381	25.6% 334	28.7% 430	27.6% 320	31.2% 399	31.3% 622
Resistance >3 CLSI subclasess[1]	10.3% 22	13.7% 77	12.4% 178	15.1% 177	10.5% 137	14.2% 213	13.6% 157	15.8% 202	15.1% 301
Resistance >4 CLSI subclasses[1]	3.3% 7	4.5% 25	5.2% 75	10.0% 117	5.7% 74	11.5% 172	10.0% 116	13.2% 169	13.1% 261
Resistance >5 CLSI subclasses[1]	1.9% 4	3.0% 17	3.3% 47	5.9% 69	3.4% 45	7.0% 105	6.1% 71	9.6% 123	8.1% 162
At least ACSSuT[2]	1.4% 3	2.7% 15	1.7% 24	4.3% 50	2.4% 32	1.9% 29	1.5% 17	0.9% 12	1.6% 31
At Least ACT/S[3]	0.0% 0	0.2% 1	0.1% 2	0.0% 0	0.1% 1	0.0% 0	0.0% 0	0.1% 1	0.1% 2
At Least ACSSuTAuCf [4]	0.0% 0	0.5% 3	0.3% 5	2.7% 32	1.1% 14	0.9% 13	1.0% 12	0.4% 5	0.9% 18
At Least Ceftiofur and Nalidixic Acid Resistant	1.9% 2	0.0% 0	2.7% 19	1.2% 6	1.5% 8	1.2% 3	0.4% 1	0.8% 2	0.0% 0

Table 22. Resistance Patterns of *Salmonella* from Turkeys, by Year, 1997-2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested	107	240	713	518	550	244	262	236	227
Resistance Pattern									
No Resistance detected	32.7% 35	41.3% 99	32.5% 232	33.4% 173	31.6% 174	30.7% 75	24.0% 63	33.5% 79	27.8% 63
Resistance >1 CLSI subclass[1]	67.3% 72	58.8% 141	67.5% 481	66.6% 345	68.4% 376	70.1% 171	76.0% 199	66.5% 157	72.2% 164
Resistance >2 CLSI subclasses[1]	49.5% 53	45.4% 109	53.7% 383	51.4% 266	56.4% 310	46.3% 113	43.5% 114	50.0% 118	53.3% 121
Resistance >3 CLSI subclasess[1]	25.2% 27	24.2% 58	27.1% 193	22.4% 116	31.3% 172	24.6% 60	24.8% 65	27.1% 64	28.2% 64
Resistance >4 CLSI subclasses[1]	6.5% 7	6.7% 16	13.2% 94	11.8% 61	16.7% 92	14.8% 36	12.2% 32	11.9% 28	11.5% 26
Resistance >5 CLSI subclasses[1]	4.7% 5	4.6% 11	7.6% 54	7.1% 37	11.1% 61	9.0% 22	6.5% 17	5.5% 13	6.2% 14
At least ACSSuT[2]	3.7% 4	0.8% 2	3.8% 27	3.3% 17	3.6% 20	4.5% 11	2.3% 6	4.7% 11	4.0% 9
At Least ACT/S[3]	0.0% 0	0.4% 1	0.4% 3	0.8% 4	0.7% 4	0.8% 2	0.0% 0	0.4% 1	0.0% 0
At Least ACSSuTAuCf [4]	3.7% 4	0.4% 1	3.4% 24	1.9% 10	2.9% 16	1.6% 4	0.8% 2	2.1% 5	1.8% 4
At Least Ceftiofur and Nalidixic Acid Resistant	1.9% 2	0.0% 0	2.7% 19	1.2% 6	1.5% 8	1.2% 3	0.4% 1	0.8% 2	0.9% 2

Table 23. Resistance Patterns of *Salmonella* from Cattle, by Year, 1997-2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested	24	284	1610	1388	893	1008	670	607	329
Resistance Pattern									
No Resistance detected	66.7% 16	73.2% 208	74.5% 1199	70.0% 972	69.9% 624	64.3% 648	61.0% 409	65.6% 398	63.2% 208
Resistance >1 CLSI subclass[1]	33.3% 8	26.8% 76	25.5% 411	30.0% 416	30.1% 269	35.9% 362	39.0% 261	34.4% 209	36.8% 121
Resistance >2 CLSI subclasses[1]	20.8% 5	17.3% 49	15.8% 254	21.8% 303	21.8% 195	28.0% 282	31.8% 213	23.9% 145	28.6% 94
Resistance >3 CLSI subclasess[1]	12.5% 3	13.7% 39	13.4% 215	19.8% 275	18.9% 169	24.6% 248	29.7% 199	21.1% 128	27.7% 91
Resistance >4 CLSI subclasses[1]	8.3% 2	9.2% 26	11.0% 177	17.5% 243	17.0% 152	22.9% 231	27.6% 185	18.9% 115	25.5% 84
Resistance >5 CLSI subclasses[1]	8.3% 2	4.6% 13	8.0% 129	14.2% 197	15.1% 135	19.3% 195	23.6% 158	18.0% 109	23.1% 76
At least ACSSuT[2]	4.2% 100.0%	4.2% 12	7.6% 123	13.1% 182	14.6% 130	17.1% 172	18.1% 121	16.3% 99	20.4% 67
At Least ACT/S[3]	0.0% 0	2.1% 6	2.2% 35	1.7% 23	2.4% 21	2.4% 24	2.7% 18	1.2% 7	4.3% 14
At Least ACSSuTAuCf [4]	0.0% 0	2.1% 6	3.7% 59	8.9% 124	11.0% 98	14.6% 147	15.1% 101	11.9% 72	17.6% 58
At Least Ceftiofur and Nalidixic Acid Resistant	0.0% 0	0.0% 0	0.1% 1	0.1% 1	0.3% 3	0.2% 2	0.4% 3	1.0% 6	0.9% 3

Table 24. Resistance Patterns of *Salmonella* from Swine, by Year, 1997-2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested	111	793	876	451	418	379	211	308	301
Resistance Pattern									
No Resistance detected	44.1% 49	49.2% 390	48.9% 428	43.2% 195	43.3% 181	40.1% 152	53.6% 113	37.3% 115	44.5% 134
Resistance >1 CLSI subclass[1]	55.9% 62	50.8% 403	51.1% 448	56.8% 256	56.7% 237	59.9% 227	46.4% 98	62.7% 193	55.5% 167
Resistance >2 CLSI subclasses[1]	43.2% 48	34.4% 273	35.3% 309	44.6% 201	40.2% 168	43.3% 164	34.1% 72	41.2% 127	40.5% 122
Resistance >3 CLSI subclasess[1]	26.1% 29	24.0% 190	26.4% 231	34.8% 157	30.6% 128	34.0% 129	23.7% 50	33.4% 103	31.9% 96
Resistance >4 CLSI subclasses[1]	15.3% 17	11.3% 90	9.8% 86	17.3% 78	9.1% 38	12.7% 48	10.9% 23	15.9% 49	13.3% 40
Resistance >5 CLSI subclasses[1]	4.5% 5	8.1% 64	7.3% 64	9.8% 44	7.2% 30	9.0% 34	10.0% 21	12.3% 38	11.0% 33
At least ACSSuT[2]	4.5% 5	7.8% 62	7.1% 62	8.6% 39	7.2% 30	7.7% 29	7.6% 16	12.0% 37	9.6% 29
At Least ACT/S[3]	0.0% 0	0.5% 4	0.5% 4	0.0% 0	1.0% 4	0.5% 2	0.9% 2	0.6% 2	1.7% 5
At Least ACSSuTAuCf [4]	0.0% 0	0.1% 1	0.6% 5	1.3% 6	2.2% 9	1.8% 7	1.9% 4	1.0% 3	2.7% 8
At Least Ceftiofur and Nalidixic Acid Resistant	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.3% 1	0.0% 0	0.0% 0	0.0% 0

[1]CLSI: Clinical and Laboratory Standards Institute M100 Document
[2]ACSSuT: resistance to at least ampicillin, chloramphenicol, streptomycin, sulfamethoxazole/sulfisoxazole, and tetracycline
[3]ACT/S: resistance to at least ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole
[4]ACSSuTAuCf: resistance to at least ACSSuT, amoxicillin-clavulanic acid, and ceftiofur

Campylobacter

Table 1. *Campylobacter* Species Tested from Chickens[1]

Campylobacter Species	1998 (n=194)	1999 (n=731)	2000 (n=765)	2001 (n=116)	2002 (n=814)	2003 (n=621)	2004 (n=694)	2005 (n=947)
C. jejuni	66.0% 128	77.0% 563	72.1% 590	55.2% 64	64.6% 526	60.2% 374	73.2% 508	59.9% 567
C. coli	32.5% 63	23.0% 168	22.5% 172	44.8% 52	35.4% 288	39.8% 247	26.8% 186	40.1% 380
Other	1.5% 3	0.0% 0	0.4% 3	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0

[1] Differences in isolation methods are described in the section on methods

Figure 1. *Campylobacter* Species Isolated from Chickens, 1998-2005

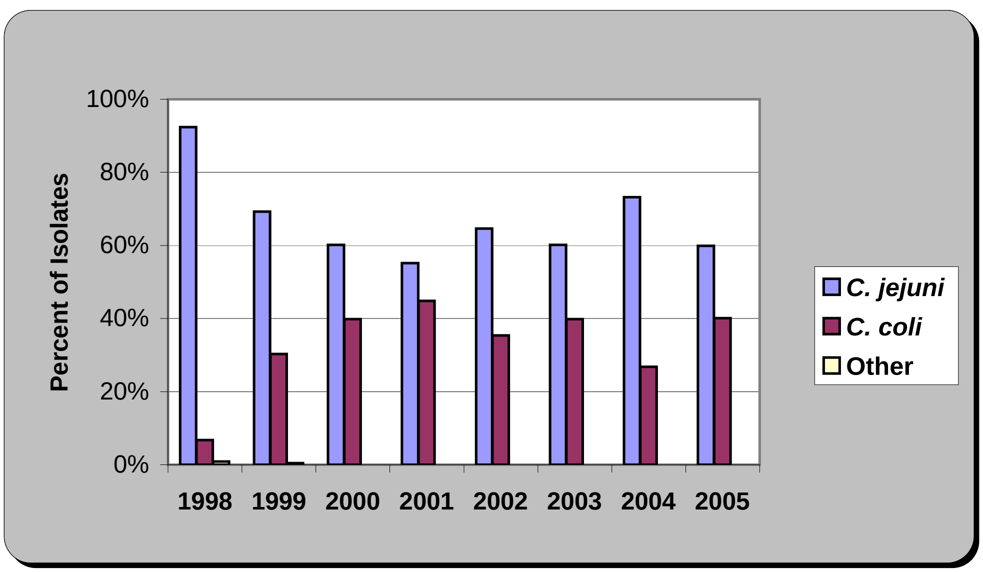

Table 2. Distribution of MICs and Occurrence of Resistance among *Campylobacter* Isolates from Chickens, 2005

Antimicrobial	Isolate Species (# of Isolates) C. coli (380) C. jejuni (567)	%I[1]	%R[2]	95% CI[3]	Distribution (%) of MICs (µg/ml)[4]													
					0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128
Aminoglycosides																		
Gentamicin	*C. coli*	0.0	0.3	0-1.7				4.2	24.5	68.7	2.4						**0.3**	
	C. jejuni	0.0	0.0	0.0-0.8				36.0	23.5	40.0	0.5							
Lincosamides																		
Clindamycin	*C. coli*	5.3	2.4	1.2-4.6		0.5	12.1	36.1	37.4	2.4	1.6	2.4	**5.3**	**1.6**	**0.3**	**0.5**		
	C. jejuni	0.5	0.4	0.1-1.5		7.9	43.0	37.2	10.1	0.7		0.2	**0.5**		**0.2**	**0.2**		
Macrolides/Ketolides																		
Azithromycin	*C. coli*	0.0	8.4	5.9-11.8	3.4	30.5	47.1	7.9	1.6	0.8	0.3						**0.3**	**8.2**
	C. jejuni	0.0	1.4	0.7-2.9	34.4	48.1	13.8	1.6	0.4	0.2	0.2			**0.2**			**0.2**	**1.1**
Erythromycin	*C. coli*	0.0	8.4	5.9-11.8		0.3	0.3	9.2	20.8	19.5	38.4	2.9	0.3			**0.3**	**0.3**	**7.9**
	C. jejuni	0.0	1.1	0.5-2.5			1.1	21.5	45.5	26.6	3.7	0.4	0.2					**1.1**
Telithromycin	*C. coli*	2.1	5.5	3.5-8.4	0.3		0.5	9.5	17.6	6.1	25.8	30.0	2.6	**2.1**	**5.5**			
	C. jejuni	0.5	0.4	0.1-1.5				3.7	29.3	49.6	13.9	2.6		**0.5**	**0.4**			
Phenicols																		
Florfenicol	*C. coli*	0.0	0.0	0.0-1.2						21.8	72.9	5.0	0.3					
	C. jejuni	0.0	0.0	0.0-0.8			0.2	0.2	2.6	49.2	44.4	3.0	0.4					
Quinolones																		
Ciprofloxacin	*C. coli*	0.0	22.1	18.1-26.7		3.2	28.9	35.3	10.0	0.5			**1.3**	**7.4**	**11.3**	**2.1**		
	C. jejuni	0.0	15.0	12.2-18.3	0.4	7.1	53.3	20.8	3.2	0.4			**1.4**	**10.2**	**3.4**			
Nalidixic acid	*C. coli*	0.8	21.6	17.6-26.2									63.9	13.2	0.5	**0.8**	**8.9**	**12.6**
	C. jejuni	2.6	14.3	11.6-17.5									71.6	10.9	0.5	**2.6**	**3.7**	**10.6**
Tetracyclines																		
Tetracycline	*C. coli*	0.0	42.1	37.1-47.3			0.5	24.5	25.5	5.3	1.3	0.3	0.5		**0.3**	**3.2**	**11.3**	**27.4**
	C. jejuni	0.7	44.1	40.0-48.3			15.2	22.4	11.8	3.7	2.1			0.7	**3.4**	**10.8**	**17.1**	**12.9**

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are CLSI breakpoints only for erythromycin, ciprofloxacin, and tetracycline.

Table 3. Antimicrobial Resistance among *Campylobacter* Isolates from Chickens by Year, 1998-2005[1,2]

Year			1998	1999	2000	2001[3]	2002	2003	2004	2005
Number of Isolates Tested		*C. coli*	63	168	172	52	288	247	186	380
		C. jejuni	128	563	590	64	526	374	508	567
Antimicrobial Class	**Antimicrobial**	**Isolate Species**								
Aminoglycosides	Gentamicin	*C. coli*	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.3% 1
		C. jejuni	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
Lincosamides	Clindamycin	*C. coli*	20.6% 13	12.5% 21	12.8% 22	3.8% 2	8.3% 24	8.9% 22	4.8% 9	2.4% 9
		C. jejuni	3.9% 5	0.5% 3	0.2% 1	0.0% 0	0.8% 4	1.1% 4	0.8% 4	0.4% 2
Macrolides/Ketolides	Azithromycin	*C. coli*	25.4% 16	14.9% 25	22.7% 39	11.5% 6	19.4% 56	20.2% 50	9.1% 17	8.4% 32
		C. jejuni	3.1% 4	0.4% 2	0.7% 4	3.1% 2	1.0% 5	1.3% 5	1.6% 8	1.4% 8
	Erythromycin	*C. coli*	23.8% 15	14.9% 25	22.7% 39	11.5% 6	18.8% 54	20.2% 50	9.1% 17	8.4% 32
		C. jejuni	3.1% 4	0.2% 1	0.5% 3	3.1% 2	0.6% 3	1.6% 6	1.6% 8	1.1% 6
	Telithromycin	*C. coli*								5.5% 21
		C. jejuni								0.4% 2
Phenicols	Chloramphenicol	*C. coli*	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	
		C. jejuni	0.0% 0	0.0% 0[4]	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	
	Florfenicol	*C. coli*								0.0% 0
		C. jejuni								0.0% 0
Quinolones	Ciprofloxacin	*C. coli*	20.6% 13	13.7% 23	14.5% 25	19.2% 10	16.0% 46	20.2% 50	26.3% 49	22.1% 84
		C. jejuni	9.4% 12	9.6% 54	10.5% 62	20.3% 13	18.6% 98	14.7% 55	21.3% 108	15.0% 85
	Nalidixic acid	*C. coli*	31.7% 20	17.3% 29	16.3% 28	21.2% 11	18.1% 52	21.9% 54	28.0% 52	21.6% 82
		C. jejuni	14.8% 19	11.9% 67	12.2% 72	20.3% 13	22.8% 120	15.5% 58	21.7% 110	14.3% 81
Tetracyclines	Tetracycline	*C. coli*	61.9% 39	57.7% 97	57.6% 99	57.7% 30	49.0% 141	51.0% 126	48.4% 90	42.1% 160
		C. jejuni	58.6% 75	53.3% 300	52.9% 312	34.4% 22	44.7% 235	47.1% 176	41.1% 209	44.1% 250

[1] From 1998 through 2004, the Etest method was used for susceptibility testing while in 2005 testing was conducted using micro-broth dilution. For breakpoints, please refer to Table 2 in the sampling and testing methods section. Etest MICs were not rounded up prior to categorization.

[2] From 1998 through 2000, nalidixic acid susceptibility and cephalothin resistance were used as selection criteria for *Campylobacter* identification

[3] These isolates were recovered from July through December, 2001, when the new ARS isolation method was used

[4] One isolate originally found to be chloramphenicol resistant was not reproducible upon further testing

Table 4. Resistance Patterns of *Campylobacter coli* Isolates, by Year, 1998-2005

Year	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested	63	168	172	52	288	247	186	380
Resistance Pattern								
No Resistance detected	19.0% 12	33.3% 56	27.9% 48	30.8% 16	37.5% 108	32.8% 81	37.1% 69	47.6% 181
Resistance ≥1 CLSI subclass[1]	81.0% 51	66.7% 112	72.1% 124	69.2% 36	62.5% 180	67.2% 166	62.9% 117	52.4% 199
Resistance ≥2 CLSI subclasses[1]	47.6% 30	26.2% 44	29.7% 51	26.9% 14	27.4% 79	32.4% 80	32.3% 60	29.2% 111
Resistance ≥3 CLSI subclasess[1]	30.2% 19	17.3% 29	18.6% 32	15.4% 8	13.9% 40	18.6% 46	18.3% 34	17.9% 68
Resistance ≥4 CLSI subclasses[1]	1.6% 1	4.8% 8	3.5% 6	1.9% 1	4.9% 14	3.6% 9	2.7% 5	2.6% 10
Resistance ≥5 CLSI subclasses[1]	0.0% 0	1.8% 3	0.0% 0	0.0% 0	2.1% 6	0.4% 1	0.5% 1	0.3% 1

[1]CLSI: Clinical and Laboratory Standards Institute M100 Document

Table 5. Resistance Patterns of *Campylobacter jejuni* Isolates, by Year, 1998-2005

Year	1998	1999	2000	2001	2002	2003	2004	2005
Number of Isolates Tested	128	563	590	64	526	374	508	567
Resistance Pattern								
No Resistance detected	38.3% 49	42.6% 240	42.2% 249	53.1% 34	44.9% 236	45.5% 170	48.2% 245	46.9% 266
Resistance ≥1 CLSI subclass[1]	61.7% 79	57.4% 323	57.8% 341	46.9% 30	55.1% 290	54.5% 204	51.8% 263	53.1% 301
Resistance ≥2 CLSI subclasses[1]	14.8% 19	11.5% 65	11.9% 70	21.9% 14	21.3% 112	16.0% 60	22.0% 112	16.0% 91
Resistance ≥3 CLSI subclasess[1]	9.4% 12	6.9% 39	6.6% 39	9.4% 6	11.4% 60	8.8% 33	12.2% 62	6.2% 35
Resistance ≥4 CLSI subclasses[1]	2.3% 3	0.0% 0	0.2% 1	0.0% 0	0.0% 0	0.0% 0	0.4% 2	0.2% 1
Resistance ≥5 CLSI subclasses[1]	1.6% 2	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.3% 1	0.0% 0	0.0% 0

[1]CLSI: Clinical and Laboratory Standards Institute M100 Document

Enterococcus

Table 1. Number of *Enterococcus* Isolates Tested from Chickens, 2003-2005

Animal Source	Year		
	2003	2004	2005
Chickens	2216	1499	1497

Table 2. *Enterococcus* Species Isolated from Chickens, 2005

Species	n	%
Faecalis	865	57.8
Faecium	312	20.8
Durans	94	6.3
Hirae	84	5.6
Gallinarum	46	3.1
Casseliflavus	44	2.9
Avium	36	2.4
Ent.species	10	0.7
Malodoratus	2	0.1
Mundtii	2	0.1
Sulfureus	1	0.1
Cecorum	1	0.1
Total	**1497**	**100.0**

Figure 1. *Enterococcus* Species Distribution in Relation to Top Species Identified in 2005

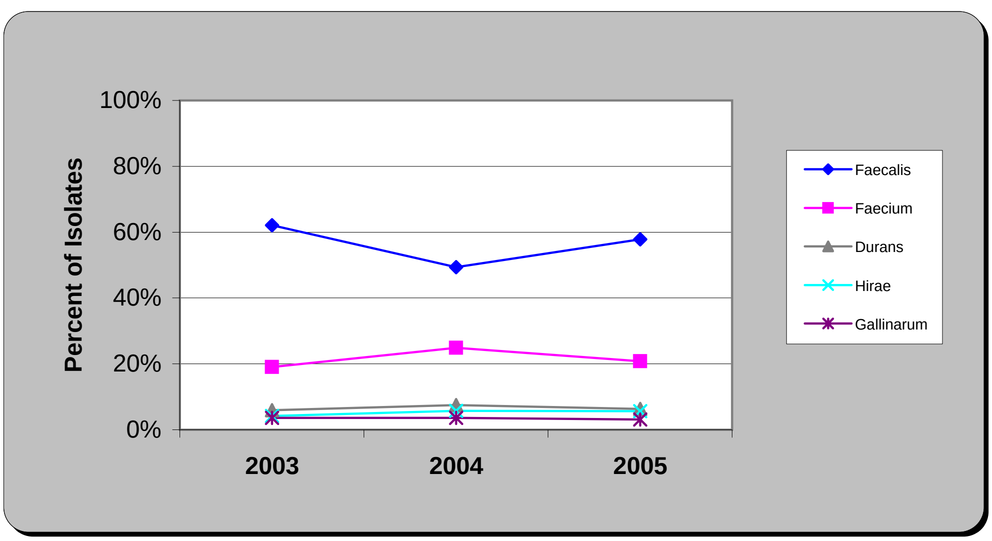

Table 3. Distribution of MICs and Occurrence of Resistance among *Enterococcus* Isolates from Chickens, 2005 (n=1497)

Antimicrobial	%I[1]	%R[2]	95% CI[3]	Distribution (%) of MICs (µg/ml)[4] 0.015	0.03	0.06	0.125	0.25	0.50	1	2	4	8	16	32	64	128	256	512	1024	2048	4096
Aminoglycosides																						
Gentamicin	N/A	**18.6**	16.7-20.7														79.6	1.7	**1.9**	**3.5**	**13.2**	
Kanamycin	N/A	**30.2**	27.9-32.6														59.4	7.7	2.7	**1.3**	**28.9**	
Streptomycin	N/A	**20.7**	18.7-22.9																79.3	**5.3**	**4.7**	**10.7**
Glycopeptide																						
Vancomycin	2.1	**0.0**	0.0-0.3						30.5	47.2	18.4	1.8	2.1									
Lincosamides																						
Lincomycin	0.8	**96.1**	95.0-97.0							2.7	0.4	0.8	**5.7**	**18.2**	**17.5**	**54.8**						
Lipopeptides																						
Daptomycin	N/A	**0.5**	0.2-1.0						35.2	41.1	13.4	9.7	**0.5**		**0.1**							
Macrolides																						
Erythromycin	23.2	**34.3**	31.9-36.8						42.5	16.2	5.3	1.7	**2.1**	**32.2**								
Tylosin	0.1	**35.1**	32.5-37.4					0.4	3.5	38.1	14.7	7.7	0.6	0.1	**0.1**	**34.9**						
Nitrofuran																						
Nitrofurantoin	13.1	**16.9**	15.1-18.9								0.4	2.6	37.3	23.0	6.7	13.1	**16.9**					
Oxazolidinone																						
Linezolid	0.1	**0.0**	0.0-0.3						3.3	53.4	43.3	0.1										
Penicillin																						
Penicillin	N/A	**1.7**	5.7-8.3						11.1	7.7	29.5	40.6	4.2	**5.2**	**1.7**							
Phenicol																						
Chloramphenicol	0.2	**0.0**	0.1-0.6								2.3	51.8	45.4	0.2								
Phosphoglycolipid																						
Flavomycin	1.5	**20.5**	18.5-22.7							61.2	6.2	6.5	4.1	1.5	**1.6**	**18.9**						
Polypeptide																						
Bacitracin	14.2	**78.9**	76.7-80.9										4.0	2.9	14.2	**19.2**	**5.2**	**54.5**				
Quinolone																						
Ciprofloxacin	12.8	**4.8**	3.9-6.2				1.1	7.8	20.3	53.2	12.8	**4.5**	**0.3**									
Streptogramin																						
Quinupristin/Dalfopristin	39.6	**28.0**								32.4	39.6	**7.9**	**11.9**	**7.4**	**0.8**							
Tetracyclines																						
Tetracycline	0.7	**70.4**	68.1-72.8									28.9	0.7	**2.2**	**10.0**	**58.2**						

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 4. Antimicrobial Resistance among *Enterococcus* Isolates from Chickens by Year, 2003-2005

Year		2003	2004	2005
Number of Isolates Tested		2216	1499	1497
Antimicrobial Class	**Antimicrobial**			
Aminoglycosides	Gentamicin	494 22.3%	296 19.7%	279 18.6%
	Kanamycin	712 32.1%	438 29.2%	452 30.2%
	Streptomycin	429 19.4%	214 14.3%	310 20.7%
Glycopeptide	Vancomycin	0 0.0%	0 0.0%	0 0.0%
Ionophore coccidiostat	Salinomycin	0 0.0%		
Lincosamides	Lincomycin	2161 97.5%	1400 93.4%	1439 96.1%
Lipopeptide	Daptomycin		29 1.9%	8 0.5%
Macrolide	Erythromycin	794 35.8%	478 31.9%	514 34.3%
	Tylosin	801 36.1%	473 31.6%	523 34.9%
Nitrofuran	Nitrofurantoin	320 14.4%	340 22.7%	253 16.9%
Oxazolidinones	Linezolid	0 0.0%	0 0.0%	0 0.0%
Penicillin	Penicillin	187 8.4%	137 9.1%	104 6.9%
Phenicol	Chloramphenicol	4 0.2%	2 0.1%	3 0.2%
Phosphoglycolipid	Flavomycin	473 21.3%	410 27.4%	307 20.5%
Polypeptide	Bacitracin	2130 96.1%	1203 80.3%	1181 78.9%
Quinolone	Ciprofloxacin	107 4.8%	164 10.9%	73 4.9%
Streptogramin	Quinupristin/Dalfopristin[1]	310 36.9%	210 27.7%	177 28.0%
Tetracyclines	Tetracycline	1568 70.8%	1069 71.3%	1055 70.5%

[1]*E.faecalis* excluded from Quinupristin/Dalfopristin results

Table 5a. Distribution of MICs and Occurrence of Resistance by Top *Enterococcus* Species Tested from Chickens, 2005 (n=1497)

Antimicrobial	Species (# of Isolates)	%I[1]	%R[2]	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	2048	4096
Aminoglycosides																							
Gentamicin	faecalis (865)	N/A	**20.8**	18.2-23.7														77.3	1.8	1.5	2.5	16.8	
	faecium (312)	N/A	**14.1**	10.5-18.6														85.3	0.6	2.2	4.5	7.4	
	durans (94)	N/A	**3.2**	0.8-9.7														95.7	1.1	2.1		1.1	
	hirae (84)	N/A	**8.3**	3.7-16.9														91.7			4.8	3.6	
	gallinarum (46)	N/A	**32.6**	20.0-48.1														63.0	4.3	6.5	13.0	13.0	
	casseliflavus (44)	N/A	**38.6**	24.7-54.5														54.5	6.8	2.3	4.5	31.8	
	avium (36)	N/A	**27.8**	14.8-45.5														66.7	5.6	2.8	13.9	11.1	
	species (10)	N/A	**30.0**	8.1-64.6														72.7		18.2		9.1	
	malodoratus (2)	N/A	**0.0**	0.0-80.2														100.0					
	mundtii (2)	N/A	**0.0**	0.0-80.2														100.0					
	sulfureus (1)	N/A	**0.0**	0.0-94.5																			
	cecorum (1)	N/A	**0.0**	0.0-94.5														100.0					
Kanamycin	faecalis (865)	N/A	**32.9**	29.8-36.2														65.9	0.6	0.6	0.2	32.7	
	faecium (312)	N/A	**19.9**	15.7-24.9														34.0	34.6	11.5	2.6	17.3	
	durans (94)	N/A	**7.4**	3.3-15.2														91.5	1.1		3.2	4.3	
	hirae (84)	N/A	**23.8**	15.5-34.6														76.2			1.2	22.6	
	gallinarum (46)	N/A	**47.8**	33.1-62.9														50.0	2.2		2.2	45.7	
	casseliflavus (44)	N/A	**70.5**	54.7-82.8														29.5			2.3	68.2	
	avium (36)	N/A	**58.3**	40.9-74.0														41.7			5.6	52.8	
	species (10)	N/A	**30.0**	8.1-64.6														72.7			9.1	18.2	
	malodoratus (2)	N/A	**0.0**	0.0-80.2														100.0					
	mundtii (2)	N/A	**0.0**	0.0-80.2														100.0					
	sulfureus (1)	N/A	**0.0**	0.0-94.5																			
	cecorum (1)	N/A	**100.0**	5.5-100																	100.0		
Streptomycin	faecalis (865)	N/A	**21.5**	18.8-24.4																78.5	3.2	3.2	15.0
	faecium (312)	N/A	**19.9**	15.7-24.9																80.1	13.8	4.2	1.9
	durans (94)	N/A	**4.3**	1.4-11.2																95.7	1.1	2.1	1.1
	hirae (84)	N/A	**27.4**	18.5-38.4																72.6	1.2	11.9	14.3
	gallinarum (46)	N/A	**47.8**	33.1-62.9																52.2	15.2	26.1	6.5
	casseliflavus (44)	N/A	**25.0**	13.7-40.6																75.0		6.8	18.2
	avium (36)	N/A	**2.8**	0.1-16.2																97.2		2.8	
	species (10)	N/A	**10.0**	0.5-45.9																90.9		9.1	
	malodoratus (2)	N/A	**0.0**	0.0-80.2																100.0			
	mundtii (2)	N/A	**0.0**	0.0-80.2																100.0			
	sulfureus (1)	N/A	**0.0**	0.0-94.5																			
	cecorum (1)	N/A	**0.0**	0.0-94.5																100.0			
Glycopeptide																							
Vancomycin	faecalis (865)	0.1	**0.0**	0.0-0.6						1.5	69.5	28.3	0.6	0.1									
	faecium (312)	0.0	**0.0**	0.0-1.5						78.2	14.4	7.4											
	durans (94)	0.0	**0.0**	0.0-4.9						94.7	5.3												
	hirae (84)	0.0	**0.0**	0.0-5.4						73.8	25.0	1.2											
	gallinarum (46)	56.5	**0.0**	0.0-9.6						2.2	2.2	2.2	37.0	56.5									
	casseliflavus (44)	6.8	**0.0**	0.0-10.0						13.6	61.4	6.8	11.4	6.8									
	avium (36)	0.0	**0.0**	0.0-12.0						91.7	8.3												
	species (10)	20.0	**0.0**	0.0-34.5						36.4	27.3	18.2		18.2									
	malodoratus (2)	0.0	**0.0**	0.0-80.2						100.0													
	mundtii (2)	0.0	**0.0**	0.0-80.2						100.0													
	sulfureus (1)	0.0	**0.0**	0.0-94.5																			
	cecorum (1)	0.0	**0.0**	0.0-94.5						100.0													

The MIC columns are headed "Distribution (%) of MICs (µg/ml)[4]".

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 5b. Distribution of MICs and Occurrence of Resistance by Top *Enterococcus* Species Tested from Chickens, 2005 (n=1497)

Antimicrobial	Species (# of Isolates)	%I[1]	%R[2]	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	2048	4096
					Distribution (%) of MICs (µg/ml)[4]																		
Lincosamides																							
Lincomycin	faecalis (865)	0.5	**99.0**	98.0-99.5							0.3	0.2	0.5	**2.3**	**18.3**	**28.2**	**50.2**						
	faecium (312)	0.6	**88.1**	83.9-91.4							10.9	0.3	0.6	**4.2**	**15.4**	**1.0**	**67.6**						
	durans (94)	2.1	**97.9**	91.8-99.6									2.1	**4.3**	**14.9**	**5.3**	**73.4**						
	hirae (84)	1.2	**98.8**	92.6-99.9									1.2	**15.5**	**21.4**	**7.1**	**54.8**						
	gallinarum (46)	0.0	**97.8**	87.0-99.9								2.2		**6.5**	**56.5**	**6.5**	**28.3**						
	casseliflavus (44)	4.5	**95.5**	83.4-99.2									4.5	**31.8**	**11.4**		**52.3**						
	avium (36)	2.8	**97.2**	83.8-99.9									2.8	**50.0**			**47.2**						
	species (10)	0.0	**80.0**	44.2-96.5							9.1	18.2			**9.1**	**9.1**	**54.5**						
	malodoratus (2)	0.0	**0.0**	0.0-80.2							100.0												
	mundtii (2)	0.0	**100.0**	19.8-100											**100.0**								
	sulfureus (1)	0.0	**0.0**	0.0-94.5																			
	cecorum (1)	0.0	**100.0**	5.5-100													**100.0**						
Lipopeptides																							
Daptomycin	faecalis (865)	N/A	**0.0**	0.0-0.6						38.7	58.7	2.3	0.2										
	faecium (312)	N/A	**2.2**	1.0-4.7						2.6	14.4	43.3	37.5	**1.9**		**0.3**							
	durans (94)	N/A	**0.0**	0.0-4.9						92.6	7.4												
	hirae (84)	N/A	**1.2**	0.1-7.4						3.6	23.8	40.5	31.0	**1.2**									
	gallinarum (46)	N/A	**0.0**	0.0-9.6						13.0	63.0	23.9											
	casseliflavus (44)	N/A	**0.0**	0.0-10.0						97.7	2.3												
	avium (36)	N/A	**0.0**	0.0-12.0						97.2	2.8												
	species (10)	N/A	**0.0**	0.0-34.5						63.6	27.3	9.1											
	malodoratus (2)	N/A	**0.0**	0.0-80.2						100.0													
	mundtii (2)	N/A	**0.0**	0.0-80.2							100.0												
	sulfureus (1)	N/A	**0.0**	0.0-94.5																			
	cecorum (1)	N/A	**0.0**	0.0-94.5						100.0													
Macrolides																							
Erythromycin	faecalis (865)	26.8	**38.0**	34.8-41.3						35.1	22.9	3.2	0.7	**2.0**	**36.1**								
	faecium (312)	28.2	**27.6**	22.8-33.0						44.2	11.9	12.8	3.5	**3.2**	**24.4**								
	durans (94)	8.5	**40.4**	30.6-51.0						51.1		2.1	6.4	**3.2**	**37.2**								
	hirae (84)	2.4	**32.1**	22.6-43.3						65.5	2.4				**32.1**								
	gallinarum (46)	8.7	**21.7**	11.4-36.7						69.6	2.2	6.5		**2.2**	**19.6**								
	casseliflavus (44)	22.7	**27.3**	15.5-43.1						50.0	6.8	11.4	4.5		**27.3**								
	avium (36)	0.0	**22.2**	10.7-39.6						77.8					**22.2**								
	species (10)	30.0	**30.0**	8.1-64.6						45.5	9.1	9.1	9.1		**27.3**								
	malodoratus (2)	0.0	**0.0**	0.0-80.2						100.0													
	mundtii (2)	0.0	**0.0**	0.0-80.2						100.0													
	sulfureus (1)	0.0	**0.0**	0.0-94.5																			
	cecorum (1)	0.0	**100.0**	5.5-100										**100.0**									
Tylosin	faecalis (865)	0.1	**39.0**	35.7-42.4					0.2	3.5	48.0	9.0	0.2		0.1		**39.0**						
	faecium (312)	0.3	**25.0**	20.4-30.3						0.6	18.6	20.2	33.0	2.2	0.3	**0.3**	**24.7**						
	durans (94)	0.0	**47.9**	37.6-58.4					4.3	8.5	29.8	9.6					**47.9**						
	hirae (84)	0.0	**32.1**	22.6-43.3						2.4	8.3	53.6	2.4	1.2			**32.1**						
	gallinarum (46)	0.0	**21.7**	11.4-36.7						6.5	63.0	6.5		2.2			**21.7**						
	casseliflavus (44)	0.0	**34.1**	20.9-50.0						2.3	54.5	9.1					**34.1**						
	avium (36)	0.0	**22.2**	10.7-39.6						5.6	16.7	44.4	11.1				**22.2**						
	species (10)	0.0	**30.0**	8.1-64.6						9.1	27.3	9.1	27.3				**27.3**						
	malodoratus (2)	0.0	**0.0**	0.0-80.2						100.0													
	mundtii (2)	0.0	**0.0**	0.0-80.2								50.0	50.0										
	sulfureus (1)	0.0	**0.0**	0.0-94.5																			
	cecorum (1)	0.0	**0.0**	0.0-94.5						100.0													

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 5c. Distribution of MICs and Occurrence of Resistance by Top *Enterococcus* Species Tested from Chickens, 2005 (n=14497)

Antimicrobial	Species (# of Isolates)	%I[1]	%R[2]	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	2048	4096
										Distribution (%) of MICs (µg/ml)[4]													
Nitrofuran																							
Nitrofurantoin	faecalis (865)	2.3	**0.8**	0.3-1.7								0.2	2.2	58.8	33.5	2.1	2.3	**0.8**					
	faecium (312)	41.7	**53.5**	47.8-59.1									0.6			4.2	41.7	**53.5**					
	durans (94)	20.2	**74.5**	64.3-82.7										1.1	2.1	2.1	20.2	**74.5**					
	hirae (84)	26.2	**8.3**	3.7-16.9											3.6	61.9	26.2	**8.3**					
	gallinarum (46)	2.2	**0.0**	0.0-9.6									30.4	58.7	6.5	2.2	2.2						
	casseliflavus (44)	0.0	**0.0**	0.0-10.0								2.3	2.3	27.3	59.1	9.1							
	avium (36)	11.1	**2.8**	0.1-16.2										11.1	50.0	25.0	11.1	**2.8**					
	species (10)	0.0	**10.0**	0.5-45.9								9.1	18.2	36.4	27.3			**9.1**					
	malodoratus (2)	0.0	**0.0**	0.0-80.2								50.0	50.0										
	mundtii (2)	0.0	**0.0**	0.0-80.2										50.0		50.0							
	sulfureus (1)	0.0	**0.0**	0.0-94.5																			
	cecorum (1)	0.0	**0.0**	0.0-94.5								100.0											
Oxazolidinone																							
Linezolid	faecalis (865)	0.1	**0.0**	0.0-0.6						1.7	51.7	46.5	0.1										
	faecium (312)	0.0	**0.0**	0.0-1.5							47.4	52.6											
	durans (94)	0.0	**0.0**	0.0-4.9						21.3	69.1	9.6											
	hirae (84)	0.0	**0.0**	0.0-5.4						3.6	42.9	53.6											
	gallinarum (46)	0.0	**0.0**	0.0-9.6						8.7	67.4	23.9											
	casseliflavus (44)	0.0	**0.0**	0.0-10.0							70.5	29.5											
	avium (36)	0.0	**0.0**	0.0-12.0						11.1	88.9												
	species (10)	0.0	**0.0**	0.0-34.5						18.2	63.6	18.2											
	malodoratus (2)	0.0	**0.0**	0.0-80.2						50.0	50.0												
	mundtii (2)	0.0	**0.0**	0.0-80.2								100.0											
	sulfureus (1)	0.0	**0.0**	0.0-94.5																			
	cecorum (1)	0.0	**0.0**	0.0-94.5							100.0												
Penicillin																							
Penicillin	faecalis (865)	N/A	**0.3**	0.1-1.0						0.3	1.3	40.2	57.6	0.2	**0.3**								
	faecium (312)	N/A	**30.4**	25.4-35.9						13.5	5.4	14.4	21.2	15.1	**23.7**	**6.7**							
	durans (94)	N/A	**1.1**	0.1-6.7						38.3	8.5	16.0	33.0	3.2		**1.1**							
	hirae (84)	N/A	**4.8**	1.6-12.5						31.0	42.9	16.7	3.6	1.2		**4.8**							
	gallinarum (46)	N/A	**2.2**	0.1-13.0						26.1	26.1	8.7	19.6	17.4	**2.2**								
	casseliflavus (44)	N/A	**0.0**	0.0-10.0						81.8	18.2												
	avium (36)	N/A	**0.0**	0.0-12.0						5.6	55.6	38.9											
	species (10)	N/A	**0.0**	0.0-34.5						72.7	9.1	9.1	9.1										
	malodoratus (2)	N/A	**0.0**	0.0-80.2										100.0									
	mundtii (2)	N/A	**0.0**	0.0-80.2							100.0												
	sulfureus (1)	N/A	**0.0**	0.0-94.5																			
	cecorum (1)	N/A	**0.0**	0.0-94.5						100.0													
Phenicol																							
Chloramphenicol	faecalis (865)	0.2	**0.1**	0-0.7								0.9	36.5	62.2	0.2		**0.1**						
	faecium (312)	0.0	**0.0**	0.0-1.5								1.9	73.4	24.7									
	durans (94)	0.0	**0.0**	0.0-4.9								10.6	62.8	26.6									
	hirae (84)	0.0	**0.0**	0.0-5.4								3.6	72.6	23.8									
	gallinarum (46)	0.0	**4.3**	0.7-16.0								6.5	78.3	10.9			**4.3**						
	casseliflavus (44)	0.0	**0.0**	0.0-10.0									75.0	25.0									
	avium (36)	0.0	**0.0**	0.0-12.0								8.3	91.7										
	species (10)	0.0	**0.0**	0.0-34.5								9.1	63.6	27.3									
	malodoratus (2)	0.0	**0.0**	0.0-80.2								50.0	50.0										
	mundtii (2)	0.0	**0.0**	0.0-80.2									50.0	50.0									
	sulfureus (1)	0.0	**0.0**	0.0-94.5																			
	cecorum (1)	100.0	**0.0**	0.0-94.5											100.0								

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 5d. Distribution of MICs and Occurrence of Resistance by Top *Enterococcus* Species Tested from Chickens, 2005 (n=1497)

Antimicrobial	Species (# of Isolates)	%I[1]	%R[2]	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	2048	4096
					Distribution (%) of MICs (µg/ml)[4]																		
Phosphoglycolipid																							
Flavomycin	faecalis (865)	0.1	**0.3**	0.1-1.0							98.5	0.8		0.2	0.1		**0.3**						
	faecium (312)	4.2	**54.8**	49.1-60.4							3.2	8.3	17.9	11.5	4.2	**4.8**	**50.0**						
	durans (94)	1.1	**7.4**	3.3-15.2							27.7	27.7	24.5	11.7	1.1	**2.1**	**5.3**						
	hirae (84)	2.4	**90.5**	81.6-95.5							3.6		2.4	1.2	2.4		**90.5**						
	gallinarum (46)	10.9	**45.7**	31.2-60.9							8.7	10.9	13.0	10.9	10.9	**4.3**	**41.3**						
	casseliflavus (44)	0.0	**52.3**	36.9-67.3							9.1	9.1	15.9	13.6		**11.4**	**40.9**						
	avium (36)	0.0	**0.0**	0.0-12.0							25.0	63.9	11.1										
	species (10)	0.0	**30.0**	8.1-64.6							54.5	9.1					**36.4**						
	malodoratus (2)	0.0	**0.0**	0.0-80.2							50.0	50.0											
	mundtii (2)	0.0	**100.0**	19.8-100													**100.0**						
	sulfureus (1)	0.0	**100.0**	5.5-100																			
	cecorum (1)	0.0	**0.0**	0.0-94.5							100.0												
Polypeptide																							
Bacitracin	faecalis (865)	17.1	**78.4**	75.5-81.1										1.5	3.0	17.1	**19.3**	**2.5**	**56.5**				
	faecium (312)	4.8	**91.7**	87.9-94.4										2.6	1.0	4.8	**17.9**	**11.9**	**61.9**				
	durans (94)	13.8	**73.4**	63.1-81.7										8.5	4.3	13.8	**7.4**	**5.3**	**60.6**				
	hirae (84)	15.5	**50.0**	39.0-61.0										29.8	4.8	15.5	**13.1**	**1.2**	**35.7**				
	gallinarum (46)	15.2	**82.6**	68.0-91.7											2.2	15.2	**34.8**	**13.0**	**34.8**				
	casseliflavus (44)	18.2	**77.3**	61.8-88.0										2.3	2.3	18.2	**36.4**	**6.8**	**34.1**				
	avium (36)	22.2	**66.7**	49.0-80.9										2.8	8.3	22.2	**27.8**	**8.3**	**30.6**				
	species (10)	10.0	**70.0**	35.4-91.9										18.2	9.1	9.1	**18.2**	**9.1**	**36.4**				
	malodoratus (2)	0.0	**0.0**	0.0-80.2										100.0									
	mundtii (2)	0.0	**100.0**	19.8-100													**100.0**						
	sulfureus (1)	0.0	**0.0**	0.0-94.5																			
	cecorum (1)	0.0	**100.0**	5.5-100															**100.0**				
Quinolone																							
Ciprofloxacin	faecalis (865)	4.4	**0.5**	0.2-1.3				0.2	2.2	23.0	69.7	4.4	**0.5**										
	faecium (312)	40.7	**22.1**	17.7-27.2					1.3	2.6	33.3	40.7	**20.5**	**1.6**									
	durans (94)	1.1	**0.0**	0.0-4.9				8.5	52.1	34.0	4.3	1.1											
	hirae (84)	0.0	**0.0**	0.0-5.4				3.6	48.8	46.4	1.2												
	gallinarum (46)	15.2	**0.0**	0.0-9.6					2.2	23.9	58.7	15.2											
	casseliflavus (44)	34.1	**0.0**	0.0-10.0				2.3	2.3	9.1	52.3	34.1											
	avium (36)	2.8	**0.0**	0.0-12.0						16.7	80.6	2.8											
	species (10)	10.0	**0.0**	0.0-34.5				18.2	9.1	27.3	36.4	9.1											
	malodoratus (2)	0.0	**0.0**	0.0-80.2						50.0	50.0												
	mundtii (2)	50.0	**0.0**	0.0-80.2						50.0		50.0											
	sulfureus (1)	0.0	**0.0**	0.0-94.5																			
	cecorum (1)	0.0	**0.0**	0.0-94.5					100.0														
Streptogramin																							
Quinupristin/Dalfopristin	faecalis (865)	N/A	**N/A**	N/A																			
	faecium (312)	25.6	**44.2**	38.6-49.9							30.1	25.6	**10.6**	**18.6**	**13.5**	**1.6**							
	durans (94)	46.8	**9.6**	4.8-17.9							43.6	46.8	**6.4**	**2.1**	**1.1**								
	hirae (84)	65.5	**28.6**	19.5-39.7							6.0	65.5	**9.5**	**14.3**	**4.8**								
	gallinarum (46)	39.1	**6.5**	1.7-18.9							54.3	39.1	**4.3**	**2.2**									
	casseliflavus (44)	90.9	**0.0**	0.0-10.0							9.1	90.9											
	avium (36)	33.3	**2.8**	0.1-16.2							63.9	33.3	**2.8**										
	species (10)	0.0	**20.0**	3.5-55.8							81.8			**18.2**									
	malodoratus (2)	0.0	**0.0**	0.0-80.2							100.0												
	mundtii (2)	50.0	**0.0**	0.0-80.2							50.0	50.0											
	sulfureus (1)	0.0	**0.0**	0.0-94.5																			
	cecorum (1)	0.0	**0.0**	0.0-94.5							100.0												
Tetracyclines																							
Tetracycline	faecalis (865)	0.2	**76.1**	73.1-78.9									23.7	0.2	**1.3**	**8.6**	**66.2**						
	faecium (312)	1.6	**54.8**	49.1-60.4									43.6	1.6	**2.6**	**4.8**	**47.4**						
	durans (94)	1.1	**75.5**	65.3-83.5									23.4	1.1	**1.1**	**17.0**	**57.4**						
	hirae (84)	1.2	**48.8**	37.8-59.9									50.0	1.2	**3.6**	**8.3**	**36.9**						
	gallinarum (46)	2.2	**93.5**	81.1-98.3									4.3	2.2	**6.5**	**21.7**	**65.2**						
	casseliflavus (44)	0.0	**86.4**	72.0-94.4									13.6		**2.3**	**13.6**	**70.5**						
	avium (36)	0.0	**77.8**	60.4-89.3									22.2		**16.7**	**58.3**	**2.8**						
	species (10)	0.0	**40.0**	13.7-72.6									63.6			**9.1**	**27.3**						
	malodoratus (2)	0.0	**0.0**	0.0-80.2									100.0										
	mundtii (2)	0.0	**0.0**	0.0-80.2									100.0										
	sulfureus (1)	0.0	**0.0**	0.0-94.5																			
	cecorum (1)	0.0	**100.0**	5.5-100													**100.0**						

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available.

Table 6. Resistance Patterns of *Enterococcus* Isolates, by Year, 2003-2005

Species	*E. faecalis*			*E. faecium*			Other		
Year	2003	2004	2005	2003	2004	2005	2003	2004	2005
Number of Isolates Tested	1376	740	865	420	373	312	420	386	320
Resistance Pattern									
No Resistance detected	0.1% 1	0.4% 3	0.2% 2	0.0% 0	0.5% 2	1.3% 4	2.6% 11	3.4% 13	1.6% 5
Resistance ≥1 CLSI subclass[1]	99.9% 1375	99.6% 737	99.8% 863	100.0% 420	99.5% 371	98.7% 308	97.4% 409	96.6% 373	98.4% 315
Resistance ≥2 CLSI subclasses[1]	99.1% 1364	95.1% 704	92.9% 804	98.8% 415	96.5% 360	97.4% 304	95.5% 401	93.3% 360	93.4% 299
Resistance ≥3 CLSI subclasess[1]	83.3% 1146	79.9% 591	76.6% 663	96.0% 403	92.0% 343	88.8% 277	89.8% 377	83.2% 321	81.3% 260
Resistance ≥4 CLSI subclasses[1]	50.3% 692	46.6% 345	43.8% 379	83.6% 351	78.3% 292	76.3% 238	76.0% 319	68.7% 265	64.1% 205
Resistance ≥5 CLSI subclasses[1]	22.2% 306	20.8% 154	21.0% 182	65.7% 276	59.8% 223	57.1% 178	49.3% 207	44.6% 172	39.1% 125

[1]CLSI: Clinical and Laboratory Standards Institute M100 Document

E.coli

Table 1. Number of *E.coli* Isolates Tested from Chickens, 2000-2005

Animal Source	Year					
	2000	2001	2002	2003	2004	2005
Chickens	285	1989	2100	1365	1697	2232

Table 2. Distribution of MICs and Occurrence of Resistance among *E.coli* Isolates from Chickens, 2005 (n=2232)

Antimicrobial	%I[1]	%R[2]	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
				Distribution (%) of MICs (µg/ml)[4]																
Aminoglycosides																				
Amikacin	0.0	0.0	0.0-0.2						1.8	24.0	53.6	16.7	3.7	0.3						
Gentamicin	4.3	36.7	34.7-38.7					5.0	37.5	13.1	2.9	0.5	4.3	**13.6**	**23.1**					
Kanamycin	3.2	10.3	9.1-11.7										75.0	11.5	3.2	**0.8**	**9.6**			
Streptomycin	N/A	58.0	55.9-60.1												41.9	**19.4**	**38.6**			
Aminopenicillins																				
Ampicillin	0.3	**22.0**	20.3-23.8							6.1	38.3	25.6	7.7	0.3	**0.4**	**21.5**	**0.1**			
β-Lactam/β-Lactamase Inhibitor Combinations																				
Amoxicillin-Clavulanic Acid	1.7	10.6	9.4-12.0							2.3	24.3	44.8	16.4	1.7	**4.8**	**5.7**				
Cephalosporins																				
Ceftiofur	2.4	6.5	5.5-7.6				5.8	63.2	20.1	1.4	0.6	2.4	**5.1**	**1.4**						
Ceftriaxone	3.8	0.0	0.0-0.2					89.2	0.9	0.8	0.1	0.9	4.3	3.0	0.8					
Cephamycins																				
Cefoxitin	2.3	9.9	8.7-11.2						0.1	0.4	14.0	55.3	18.0	2.3	**5.3**	**4.6**				
Folate Pathway Inhibitors																				
Sulfonamides	0.0	51.9	49.8-51.0											45.6	2.0	0.2	0.1	0.2	**51.9**	
Trimethoprim-Sulfamethoxazole	0.0	10.4	9.2-11.8				54.4	23.4	7.3	3.5	1.0	**0.2**	**10.2**							
Phenicols																				
Chloramphenicol	0.4	1.0	0.6-1.5								3.8	62.9	31.9	0.4	**0.2**	**0.8**				
Quinolones																				
Ciprofloxacin	0.0	0.4	0.2-0.8	91.6	0.6	0.3	3.8	2.7	0.5	0.1			**0.4**							
Nalidixic Acid	0.0	7.5	6.5-8.7						0.1	13.3	66.9	11.9	0.2		**0.4**	**7.2**				
Tetracyclines																				
Tetracycline	1.1	48.9	46.8-51.0									50.0	1.1	**1.5**	**14.5**	**32.9**				

[1] Percent of isolates with intermediate susceptibility

[2] Percent of isolates that were resistant

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

[4] 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 area 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. CLSI breakpoints were used when available. There are no CLSI breakpoints for streptomycin.

Table 3. Antimicrobial Resistance among *E.coli* Isolates from Chickens by Year, 2000-2005

Year		2000	2001	2002	2003	2004	2005
Number of Isolates Tested		285	1989	2100	1365	1697	2232
Antimicrobial Class	**Antimicrobial (Resistance Breakpoint)**						
Aminoglycosides	Amikacin	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0	0.0% 0
	Gentamicin	40.0% 114	33.4% 664	38.0% 799	38.8% 530	39.1% 663	36.7% 819
	Kanamycin	16.1% 46	14.5% 288	11.6% 243	10.3% 140	11.5% 196	10.3% 231
	Streptomycin	77.5% 221	65.8% 1308	65.1% 1368	64.2% 877	64.1% 1088	58.0% 1295
Aminopenicillins	Ampicillin	20.0% 57	19.5% 388	19.0% 399	18.6% 254	17.6% 298	22.0% 492
β-Lactam/β-Lactamase Inhibitor Combinations	Amoxicillin-Clavulanic Acid	8.1% 23	10.0% 199	10.9% 229	11.1% 151	8.8% 149	10.6% 236
Cephalosporins	Ceftiofur	6.3% 18	4.4% 88	5.5% 115	7.1% 97	4.9% 83	6.5% 145
	Ceftriaxone	0.0% 0	0.0% 0	0.0% 1	0.0% 0	0.1% 1	0.0% 1
Cephalosporins	Cephalothin	17.9% 51	12.9% 256	15.1% 317	16.6% 226		
Cephamycins	Cefoxitin	7.4% 21	8.7% 173	8.5% 178	8.3% 113	8.2% 139	9.9% 221
Folate Pathway Inhibitors	Sulfonamides	57.9% 165	58.2% 1157	46.1% 969	43.9% 599	53.2 903	51.9 1159
	Trimethoprim-Sulfamethoxazole	17.2% 49	12.6% 251	10.4% 218	10.5% 144	10.7 181	10.4 232
Phenicols	Chloramphenicol	4.6% 13	2.4% 47	1.8% 38	1.3% 18	1.0% 17	1.0% 22
Quinolones	Ciprofloxacin	0.0% 0	0.2% 3	0.0% 1	0.1% 1	0.2% 3	0.4% 8
	Nalidixic Acid	10.2% 29	8.4% 168	6.8% 142	6.2% 84	6.8% 115	7.5% 168
Tetracyclines	Tetracycline	68.4% 195	61.6% 1226	58.6% 1231	52.2% 713	50.3% 853	48.9% 1092

Table 4. Resistance Patterns of *E.coli* Isolates, by Year, 2000-2005

Year	2000	2001	2002	2003	2004	2005
Number of Isolates Tested	285	1989	2100	1365	1697	2232
Resistance Pattern						
No Resistance detected	10.2% 29	14.2% 282	17.1% 360	17.4% 238	18.5% 314	19.5% 435
Resistance $\geq$1 CLSI subclass[1]	89.8% 256	85.8% 1707	82.9% 1740	82.6% 1127	81.5% 1383	80.5% 1797
Resistance $\geq$2 CLSI subclasses[1]	69.1% 197	62.5% 1243	60.3% 1267	55.4% 756	54.2% 920	53.0% 1184
Resistance $\geq$3 CLSI subclasess[1]	33.3% 95	25.3% 503	23.7% 498	23.0% 314	21.7% 369	23.0% 513
Resistance $\geq$4 CLSI subclasses[1]	13.0% 37	11.9% 237	12.0% 251	10.9% 149	9.1% 155	12.2% 273
Resistance $\geq$5 CLSI subclasses[1]	7.4% 21	7.3% 146	6.8% 142	7.0% 95	5.6% 95	7.6% 169

[1]CLSI: Clinical and Laboratory Standards Institute M100 Document