

**Table 4A. Antimicrobial Resistance among *Salmonella* by Animal Source, 1997-2009**

Year			1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
<b>Number of Isolates Tested</b>		Chickens	214	561	1438	1173	1307	1500	1158	1280	1989	1380	994	624	551	
		Turkeys	107	240	713	518	550	244	262	236	227	304	271	148	121	
		Cattle	24	284	1610	1388	893	1008	670	607	329	389	439	443	200	
		Swine	111	793	876	451	418	379	211	308	301	304	211	111	120	
<b>Antimicrobial Class</b>	<b>Antimicrobial</b>	<b>Isolate Source</b>														
<b>Aminoglycosides</b>	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	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	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	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	0.0% 0	0.0% 0	0.5% 1	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	5.7% 79	4.5% 45	5.6% 35	5.6% 31	
		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	16.4% 50	12.9% 35	16.9% 25	14.9% 18	
		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	3.9% 15	1.6% 7	1.6% 7	2.0% 4	
		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	2.0% 6	0.9% 2	2.7% 3	0.0% 0	
	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	3.6% 49	3.4% 34	3.4% 21	3.1% 17	
		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	10.5% 32	16.2% 44	14.2% 21	10.7% 13	
		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	9.5% 37	7.7% 34	9.9% 44	9.0% 18	
		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	8.6% 26	7.1% 15	3.6% 4	4.2% 5	
	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	21.2% 293	19.3% 192	25.2% 157	30.5% 168	
		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	28.9% 88	34.7% 94	32.4% 48	38.8% 47	
		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	23.7% 92	19.8% 87	23.0% 102	22.0% 44	
		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	26.3% 80	27.0% 57	29.7% 33	29.2% 35	
	<b><math>\beta</math>-Lactam/<math>\beta</math>-Lactamase Inhibitor Combinations</b>	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	12.9% 178	15.6% 155	8.7% 54	12.9% 71
			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	5.6% 17	11.1% 30	5.4% 8	13.2% 16
			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	18.5% 72	15.5% 68	16.5% 73	15.0% 30
			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	2.3% 7	3.3% 7	4.5% 5	4.2% 5

**Table 4A (continued). Resistance among *Salmonella* by Animal Source, 1997-2009**

Year		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
Number of Isolates Tested	Chickens	214	561	1438	1173	1307	1500	1158	1280	1989	1380	994	624	551	
	Turkeys	107	240	713	518	550	244	262	236	227	304	271	148	121	
	Cattle	24	284	1610	1388	893	1008	670	607	329	389	439	443	200	
	Swine	111	793	876	451	418	379	211	308	301	304	211	111	120	
Antimicrobial Class	Antimicrobial	Isolate Source													
Cepheims	Cefoxitin	Chickens	Not Tested	Not Tested	Not Tested	7.2%	4.1%	8.7%	8.2%	12.4%	12.0%	12.8%	13.0%	8.0%	11.4%
			Tested	Tested	Tested	85	53	130	95	159	238	176	129	50	63
		Turkeys	Not Tested	Not Tested	Not Tested	3.3%	4.5%	2.5%	1.1%	5.1%	3.5%	5.3%	9.2%	5.4%	12.4%
			Tested	Tested	Tested	17	25	6	3	12	8	16	25	8	15
	Cattle	Not Tested	Not Tested	Not Tested	9.1%	11.1%	15.9%	17.8%	13.2%	19.8%	17.7%	15.0%	14.7%	13.5%	
		Tested	Tested	Tested	126	99	160	119	80	65	69	66	65	27	
	Swine	Not Tested	Not Tested	Not Tested	1.3%	2.2%	2.9%	4.3%	1.9%	3.7%	2.0%	2.8%	4.5%	4.2%	
		Tested	Tested	Tested	6	9	11	9	6	11	6	6	5	5	
	Ceftiofur	Chickens	0.5%	2.0%	5.2%	7.6%	4.1%	10.2%	9.8%	12.4%	12.2%	12.8%	15.4%	8.7%	12.7%
			1	11	75	89	54	153	113	159	242	177	153	54	70
		Turkeys	3.7%	0.4%	4.6%	3.3%	5.1%	3.3%	1.5%	4.7%	3.5%	5.3%	11.1%	5.4%	12.4%
			4	1	33	17	28	8	4	11	8	16	30	8	15
	Cattle	0.0%	2.1%	4.2%	9.8%	11.4%	17.4%	21.0%	13.3%	21.6%	18.8%	15.5%	16.3%	14.5%	
		0	6	67	136	102	175	141	81	71	73	68	72	29	
	Swine	0.0%	0.1%	1.9%	1.3%	2.2%	3.2%	4.3%	1.9%	3.7%	2.0%	2.8%	4.5%	4.2%	
		0	1	17	6	9	12	9	6	11	6	6	5	5	
	Ceftriaxone	Chickens	0.5%	1.8%	4.6%	7.4%	4.1%	9.9%	9.7%	12.3%	12.2%	12.8%	15.6%	8.7%	12.9%
			1	10	66	87	54	149	112	158	242	177	155	54	71
		Turkeys	3.7%	0.4%	4.2%	3.1%	4.7%	3.3%	1.1%	4.7%	3.5%	5.3%	11.1%	5.4%	12.4%
			4	1	30	16	26	8	3	11	8	16	30	8	15
Cattle	0.0%	2.1%	3.9%	9.9%	11.3%	17.3%	21.0%	13.5%	20.7%	18.5%	15.9%	16.0%	14.5%		
	0	6	63	137	101	174	141	82	68	72	70	71	29		
Swine	0.0%	0.1%	1.3%	1.3%	2.2%	2.9%	4.3%	1.6%	3.7%	1.6%	2.4%	4.5%	4.2%		
	0	1	11	6	9	11	9	5	11	5	5	5	5		
Cephalothin	Chickens	1.4%	4.5%	5.8%	7.8%	4.7%	10.5%	10.4%	10.4%	Not Tested					
		3	25	83	91	62	158	121	121						
	Turkeys	5.6%	5.0%	10.5%	8.3%	13.1%	9.8%	11.1%	11.1%	Not Tested					
		6	12	75	43	72	24	29	29						
Cattle	0.0%	2.1%	4.7%	9.9%	11.6%	17.7%	21.2%	21.2%	Not Tested						
	0	6	76	137	104	178	142	142							
Swine	0.0%	0.1%	0.8%	2.4%	2.2%	3.2%	3.8%	3.8%	Not Tested						
	0	1	7	11	9	12	8	8							
Folate Pathway Inhibitors	Sulfonamides <sup>1</sup>	Chickens	24.8%	23.7%	15.9%	18.4%	11.8%	8.9%	10.3%	11.9%	8.5%	10.7%	10.4%	13.3%	10.0%
			53	133	229	216	154	133	119	152	169	148	103	83	55
		Turkeys	37.4%	32.1%	36.0%	25.1%	38.0%	30.3%	28.2%	36.4%	37.0%	27.3%	25.5%	24.3%	28.9%
			40	77	257	130	209	74	74	86	84	83	69	36	35
	Cattle	20.8%	15.5%	15.0%	19.9%	19.7%	22.3%	25.1%	22.7%	27.4%	24.2%	21.6%	24.8%	24.5%	
		5	44	242	276	176	225	168	138	90	94	95	110	49	
	Swine	34.2%	29.0%	30.7%	35.7%	34.9%	34.6%	25.1%	37.0%	32.9%	26.6%	30.8%	31.5%	30.8%	
		38	230	269	161	146	131	53	114	99	81	65	35	37	
Trimethoprim-Sulfamethoxazole	Chickens	0.5%	1.2%	1.1%	0.4%	0.5%	0.8%	0.3%	0.2%	0.2%	0.1%	0.0%	0.3%	0.2%	
		1	7	16	5	6	12	4	3	4	1	0	2	1	
	Turkeys	3.7%	2.5%	4.2%	1.5%	2.5%	2.5%	2.3%	0.8%	1.8%	1.0%	1.1%	1.4%	1.7%	
		4	6	30	8	14	6	6	2	4	3	3	2	2	
Cattle	4.2%	2.5%	2.4%	2.2%	2.6%	2.5%	3.3%	1.5%	4.9%	4.6%	3.0%	4.5%	1.5%		
	1	7	39	30	23	25	22	9	16	18	13	20	3		
Swine	1.8%	0.3%	1.1%	0.9%	0.0%	1.6%	2.4%	1.6%	2.3%	2.0%	1.9%	2.7%	2.5%		
	2	2	10	4	0	6	5	5	7	6	4	3	3		

<sup>1</sup> Sulfamethoxazole was tested from 1997-2003 and was replaced by sulfisoxazole in 2004

**Table 4A (continued). Resistance among *Salmonella* by Animal Source, 1997-2009**

Year		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
<b>Number of Isolates Tested</b>	Chickens	214	561	1438	1173	1307	1500	1158	1280	1989	1380	994	624	551	
	Turkeys	107	240	713	518	550	244	262	236	227	304	271	148	121	
	Cattle	24	284	1610	1388	893	1008	670	607	329	389	439	443	200	
	Swine	111	793	876	451	418	379	211	308	301	304	211	111	120	
<b>Penicillins</b>	Ampicillin	Chickens	11.7%	12.8%	12.4%	13.0%	9.4%	14.3%	13.7%	14.5%	14.0%	14.9%	17.0%	10.6%	13.8%
		Turkeys	25	72	179	152	123	215	159	185	279	205	169	66	76
		Cattle	12.1%	10.4%	17.7%	16.2%	19.5%	18.0%	18.7%	22.0%	22.9%	25.3%	36.9%	32.4%	38.8%
		Swine	13	25	126	84	107	44	49	52	52	77	100	48	47
<b>Phenicols</b>	Chloramphenicol	Chickens	12.5%	9.2%	12.5%	18.7%	17.9%	23.9%	28.1%	19.3%	26.7%	22.4%	20.0%	21.7%	22.5%
		Turkeys	3	26	202	259	160	241	188	117	88	87	88	96	45
		Cattle	16.2%	12.9%	10.8%	18.8%	11.7%	13.7%	12.8%	16.2%	13.6%	11.5%	18.0%	14.4%	19.2%
		Swine	18	102	95	85	49	52	27	50	41	35	38	16	23
<b>Quinolones</b>	Ciprofloxacin	Chickens	2.3%	2.9%	1.8%	4.6%	2.5%	2.4%	2.1%	1.3%	1.8%	1.7%	1.8%	1.8%	1.6%
		Turkeys	5	16	26	54	33	36	24	16	36	24	18	11	9
		Cattle	3.7%	0.8%	4.1%	4.1%	3.8%	5.3%	4.2%	4.7%	4.8%	3.9%	5.5%	2.7%	3.3%
		Swine	4	2	29	21	21	13	11	11	11	12	15	4	4
<b>Quinolones</b>	Nalidixic Acid	Chickens	4.2%	5.6%	8.5%	15.1%	16.5%	20.6%	25.1%	17.6%	21.9%	19.8%	20.0%	19.6%	21.0%
		Turkeys	1	16	137	209	147	208	168	107	72	77	88	87	42
		Cattle	11.7%	8.4%	8.0%	12.4%	7.7%	10.0%	8.5%	12.7%	10.6%	7.9%	15.2%	9.9%	15.0%
		Swine	13	67	70	56	32	38	18	39	32	24	32	11	18
<b>Quinolones</b>	Ciprofloxacin	Chickens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Turkeys	0	0	0	0	0	0	1	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%
		Swine	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Quinolones</b>	Nalidixic Acid	Chickens	0.0%	0.2%	0.2%	0.5%	0.0%	0.8%	0.4%	0.5%	0.3%	0.1%	0.1%	0.0%	0.0%
		Turkeys	0	1	3	6	0	12	5	6	6	2	1	0	0
		Cattle	4.7%	2.1%	5.3%	5.4%	5.1%	5.3%	3.8%	2.1%	2.2%	0.7%	1.1%	0.7%	0.8%
		Swine	5	5	38	28	28	13	10	5	5	2	3	1	1
<b>Tetracyclines</b>	Tetracycline	Chickens	0.0%	0.4%	0.1%	0.4%	0.4%	0.4%	0.4%	2.0%	1.5%	0.5%	0.7%	0.7%	1.0%
		Turkeys	0	1	1	6	4	4	3	12	5	2	3	3	2
		Cattle	0.0%	0.0%	0.0%	0.2%	0.0%	0.3%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%
		Swine	0	0	0	1	0	1	0	0	1	0	0	0	0
<b>Tetracyclines</b>	Tetracycline	Chickens	20.6%	20.5%	25.0%	26.3%	21.9%	24.9%	26.2%	27.4%	28.3%	31.8%	35.5%	30.4%	33.9%
		Turkeys	44	115	359	308	286	374	303	351	563	439	353	190	187
		Cattle	52.3%	45.8%	52.9%	56.2%	54.9%	54.5%	58.8%	48.3%	54.6%	61.8%	73.8%	64.2%	63.6%
		Swine	56	110	377	291	302	133	154	114	124	188	200	95	77
<b>Tetracyclines</b>	Tetracycline	Chickens	25.0%	24.3%	20.9%	25.8%	26.3%	32.0%	36.9%	31.8%	34.0%	30.3%	27.3%	29.3%	29.0%
		Turkeys	6	69	336	358	235	323	247	193	112	118	120	130	58
		Cattle	52.3%	47.5%	48.4%	54.3%	53.1%	57.8%	43.1%	58.8%	54.8%	62.8%	54.5%	51.4%	53.3%
		Swine	58	377	424	245	222	219	91	181	165	191	115	57	64