

Progress Report on *Salmonella* Testing of Raw Meat and Poultry Products, 1998-2001

The Food Safety and Inspection Service (FSIS) issued the Pathogen Reduction; Hazard Analysis and Critical Control Point (HACCP) Systems; Final Rule on July 25, 1996: Federal Register, Vol. 61, No. 144, pp. 38805-38989 (http://www.fsis.usda.gov/OA/fr/haccp_rule.htm). To verify that industry Pathogen Reduction/HACCP (PR/HACCP) systems are effective in controlling the contamination of raw meat and poultry products with disease-causing bacteria, the PR/HACCP rule sets *Salmonella* performance standards that slaughter establishments and establishments that produce raw ground products should meet. These product-specific limits on *Salmonella* became effective in large establishments on January 26, 1998; in small establishments, on January 25, 1999; and in very small establishments, on January 25, 2000. FSIS verifies that establishments are meeting the standards by having federal inspection personnel collect randomly selected product samples and send them to FSIS laboratories for *Salmonella* analysis, according to procedures described in Appendix E of the PR/HACCP final rule: Federal Register, Vol. 61, No. 144, pp. 38917-38928 (http://www.fsis.usda.gov/OA/fr/haccp_rule.htm).

The *Salmonella* performance standards are based on the prevalence of *Salmonella* as determined from the agency's nationwide microbial baseline studies (<http://www.fsis.usda.gov/OPHS/baseline/contents.htm>) conducted before PR/HACCP was implemented. Raw products currently covered by performance standards are carcasses of cows/bulls, steers/heifers, market hogs, and broilers; and ground beef, ground chicken, and ground turkey. The performance standards are expressed in terms of the maximum number of *Salmonella*-positive samples that are allowed per sample set. The number of samples in a sample set varies by product, and the maximum number of positive samples allowed in a set provides an 80% probability of passing when the establishment is operating at the standard. An initial sample set or a set that follows a passed set is designated an "A" set; other codes (such as "B" and "C") represent sample sets collected from establishments targeted for follow-up testing following a failed set. Code "A" sample sets are collected at randomly selected establishments.

The data analyzed for this report are from code "A" sample sets. The laboratory results from follow-up testing resulting from failed "A" sample sets (that is, the results from "B" and "C" sets) are not included because they do not represent a random sampling of establishments. Presenting the "A" set data provides the most direct comparison to the baseline estimates that were used to establish the performance standards. *Salmonella* prevalence estimates are based on all "A" set samples collected during the indicated year, with no consideration given as to whether a sample is part of a complete or an incomplete set. The prevalence estimate is the number of positive samples divided by the total number of samples analyzed, expressed as a percentage. The percentages of sample sets meeting the *Salmonella* performance standards are based on "A" sets that were completed during the specified year, as defined by the collect date of the last sample in the sample set.

During the last year (CY 2001), *Salmonella* prevalence in all product categories with performance standards was lower than in agency baseline studies and surveys conducted before PR/HACCP implementation (Table 1). Differences in pre- versus post-HACCP *Salmonella* prevalence may reflect changes due to HACCP implementation.

During 2001, both increases and decreases from the previous year in prevalence for specific product categories were observed. For example, for all sizes of inspected establishments, the CY 2001 *Salmonella* prevalence in broilers was 11.9 percent, as compared with 9.1 percent in CY 2000. As might be expected, the *Salmonella* prevalence for ground chicken also increased from 13.8 percent to 19.5 percent based on a relatively small number of samples. However, the levels for broilers and ground chicken for CY 2001 are still well below the baseline prevalences of 20 percent and 44.6 percent, respectively. (Although there are few very small broiler establishments, CY 2001 testing suggests that, as a group, they are having difficulty meeting the performance standard.)

In the previous progress report covering the three years of 1998 through 2000, the agency pointed out that small market hog establishments were having the most difficulty meeting an existing performance standard. However, the progress report noted that *Salmonella* prevalence in code "A" market hog carcass samples from small establishments had decreased from 18.0 percent in CY 1999 to 7.7 percent in CY 2000, compared to the 8.7 percent baseline prevalence. For CY 2001, the *Salmonella* prevalence in market hog carcasses from small establishments continued to decrease to 3.5 percent, well below the baseline prevalence. The prevalence for very small market hog establishments was almost as low, 4.4 percent as compared with 7.2 percent in CY 2000. The overall *Salmonella* prevalence for ground beef continued to decline to 2.8 percent, based on over 24,000 samples from all sizes of establishments.

The results of four years of testing show that the majority of completed code "A" sample sets meets the *Salmonella* performance standard (Table 2). *Salmonella* compliance for all sizes of establishments and all years combined is: 90.8% for broilers, 82.9% for market hogs, 83.7% for cows/bulls, 96.8% for steers/heifers, 91.8% for ground beef, 100.0% for ground chicken, and 90.5% for ground turkey. There were relatively small changes from CY 2000 to CY 2001 in the overall percentages (all sizes of establishments) of code "A" sample sets meeting the performance standards. The percentage of ground beef "A" sets that passed increased from 91.0 percent in CY 2000 to 95.5 percent in CY 2001. For small establishments, the percentage of sets passing either increased or remained about the same for all seven product categories.

Achieving a reduction in pathogens reduces the risk of illness. However, all segments of the food chain and consumers should continue to properly handle, cook, and store all meat, poultry, and other food products in order to guard against foodborne illness.

For More Information:

- Media – (202) 720-9113
- Congressional – (202) 720-3897
- Constituent – (202) 720-8594
- Consumer inquiries – Call USDA's Meat and Poultry Hotline at 1-800-535-4555. In the Washington, DC, area, call (202) 720-3333. The TTY number is 1-800-256-7072.
- Technical inquiries – Dr. Walter Hill, Office of Public Health and Science, Biosciences Division, (202) 690-6369.
- FSIS Web Site: <http://www.fsis.usda.gov>

Table 1

Prevalence^a of *Salmonella* in the PR/HACCP Verification Testing Program
By Calendar Year, 1998 - 2001

"A" Sets

		CY 2001							
Product	Baseline Prevalence (%)	Large Establishments		Small Establishments		Very Small Establishments		All Sizes Establishments	
		# Samp	% Pos	# Samp	% Pos	# Samp	% Pos	# Samp	% Pos
Broilers	20.0	5,879	9.7%	2,684	13.0%	392	37.2%	8,955	11.9%
Market Hog	8.7	1,419	1.6%	1,385	3.5%	5,286	4.4%	8,090	3.8%
Cows/Bulls	2.7	72	0.0%	1,045	1.3%	1,059	3.7%	2,176	2.4%
Steer/Heif	1.0	58	0.0%	411	0.2%	1,226	0.8%	1,695	0.6%
Grd Beef	7.5	691	3.6%	11,749	3.5%	11,803	2.1%	24,243	2.8%
Grd Chick	44.6	90	26.7%	131	16.8%	41	12.2%	262	19.5%
Grd Turkey	49.9	313	25.2%	144	27.1%	63	28.6%	520	26.2%

		CY 2000							
Product	Baseline Prevalence (%)	Large Establishments		Small Establishments		Very Small Establishments		All Sizes Establishments	
		# Samp	% Pos	# Samp	% Pos	# Samp	% Pos	# Samp	% Pos
Broilers	20.0	7,175	7.5%	2,821	13.0%	61	18.0%	10,057	9.1%
Market Hog	8.7	1,919	4.1%	2,144	7.7%	1,107	7.2%	5,170	6.2%
Cows/Bulls	2.7	173	0.6%	1,593	2.1%	229	3.5%	1,995	2.2%
Steer/Heif	1.0	222	0.0%	693	0.6%	177	0.0%	1,092	0.4%
Grd Beef	7.5	1,373	5.4%	21,065	3.4%	10,406	2.7%	32,844	3.3%
Grd Chick	44.6	169	12.4%	233	15.0%	12	8.3%	414	13.8%
Grd Turkey	49.9	1,173	26.5%	377	23.3%	1	0.0%	1,551	25.7%

		CY 1999							
Product	Baseline Prevalence (%)	Large Establishments		Small Establishments		Very Small Establishments		All Sizes Establishments	
		# Samp	% Pos	# Samp	% Pos	# Samp	% Pos	# Samp	% Pos
Broilers	20.0	4,530	9.3%	2,238	15.6%	0		6,768	11.4%
Market Hog	8.7	973	1.8%	950	18.0%	0		1,923	9.8%
Cows/Bulls	2.7	116	0.9%	1,405	2.3%	0		1,521	2.2%
Steer/Heif	1.0	272	0.4%	510	0.2%	0		782	0.3%
Grd Beef	7.5	765	6.7%	15,610	4.2%	0		16,375	4.3%
Grd Chick	44.6	125	15.2%	172	16.9%	0		297	16.2%
Grd Turkey	49.9	759	33.1%	291	27.8%	0		1,050	31.6%

		CY 1998							
Product	Baseline Prevalence (%)	Large Establishments		Small Establishments		Very Small Establishments		All Sizes Establishments	
		# Samp	% Pos	# Samp	% Pos	# Samp	% Pos	# Samp	% Pos
Broilers	20.0	5,645	10.8%	14	7.1%	0		5,659	10.8%
Market Hog	8.7	1,390	5.8%	0		0		1,390	5.8%
Cows/Bulls	2.7	58	0.0%	121	1.7%	0		179	1.1%
Steer/Heif	1.0	214	0.0%	0		0		214	0.0%
Grd Beef	7.5	1,125	4.9%	171	16.4%	0		1,296	6.4%
Grd Chick	44.6	24	4.2%	0		0		24	4.2%
Grd Turkey	49.9	591	36.5%	0		0		591	36.5%

		All Years 1998 - 2001							
Product	Baseline Prevalence (%)	Large Establishments		Small Establishments		Very Small Establishments		All Sizes Establishments	
		# Samp	% Pos	# Samp	% Pos	# Samp	% Pos	# Samp	% Pos
Broilers	20.0	23,229	9.2%	7,757	13.7%	453	34.7%	31,439	10.7%
Market Hog	8.7	5,701	3.5%	4,479	8.6%	6,393	4.9%	16,573	5.4%
Cows/Bulls	2.7	419	0.5%	4,164	2.0%	1,288	3.6%	5,871	2.2%
Steer/Heif	1.0	766	0.1%	1,614	0.4%	1,403	0.7%	3,783	0.4%
Grd Beef	7.5	3,954	5.2%	48,595	3.8%	22,209	2.4%	74,758	3.4%
Grd Chick	44.6	408	15.9%	536	16.0%	53	11.3%	997	15.7%
Grd Turkey	49.9	2,836	30.2%	812	25.6%	64	28.1%	3,712	29.2%

^a Prevalence estimates include all samples collected during the indicated calendar year.

Table 2

Percent of Sample Sets Meeting the Salmonella Performance Standards^b
By Calendar Year, 1998 - 2001

"A" Sets

Product	CY 2001											
	Large Establishments			Small Establishments			Very Small Establishments			All Sizes Establishments		
	#	Sets	% Pass	#	Sets	% Pass	#	Sets	% Pass	#	Sets	% Pass
Broilers	117		94.0%	49		89.8%	4		25.0%	170		91.2%
Market Hog	25		96.0%	23		91.3%	49		77.6%	97		85.6%
Cows/Bulls	2		100.0%	15		93.3%	17		76.5%	34		85.3%
Steer/Heif	1		100.0%	8		100.0%	4		100.0%	13		100.0%
Grd Beef	13		92.3%	200		94.0%	213		97.2%	426		95.5%
Grd Chick	1		100.0%	4		100.0%	1		100.0%	6		100.0%
Grd Turkey	9		88.9%	6		100.0%	1		100.0%	16		93.8%

Product	CY 2000											
	Large Establishments			Small Establishments			Very Small Establishments			All Sizes Establishments		
	#	Sets	% Pass	#	Sets	% Pass	#	Sets	% Pass	#	Sets	% Pass
Broilers	137		96.4%	53		79.2%	0			190		91.6%
Market Hog	32		93.8%	34		70.6%	0			66		81.8%
Cows/Bulls	2		100.0%	30		83.3%	0			32		84.4%
Steer/Heif	3		100.0%	8		87.5%	0			11		90.9%
Grd Beef	27		81.5%	344		91.9%	75		90.7%	446		91.0%
Grd Chick	3		100.0%	2		100.0%	0			5		100.0%
Grd Turkey	15		93.3%	2		50.0%	0			17		88.2%

Product	CY 1999											
	Large Establishments			Small Establishments			Very Small Establishments			All Sizes Establishments		
	#	Sets	% Pass	#	Sets	% Pass	#	Sets	% Pass	#	Sets	% Pass
Broilers	111		91.0%	40		85.0%	0			151		89.4%
Market Hog	26		100.0%	12		50.0%	0			38		84.2%
Cows/Bulls	2		100.0%	17		76.5%	0			19		78.9%
Steer/Heif	3		100.0%	3		100.0%	0			6		100.0%
Grd Beef	21		85.7%	252		87.3%	0			273		87.2%
Grd Chick	2		100.0%	3		100.0%	0			5		100.0%
Grd Turkey	18		94.4%	5		80.0%	0			23		91.3%

CY 1998												
Product	Large Establishments			Small Establishments			Very Small Establishments			All Sizes Establishments		
	#	Sets	% Pass	#	Sets	% Pass	#	Sets	% Pass	#	Sets	% Pass
Broilers	77		90.9%	0			0			77		90.9%
Market Hog	16		68.8%	0			0			16		68.8%
Cows/Bulls	1		100.0%	0			0			1		100.0%
Steer/Heif	1		100.0%	0			0			1		100.0%
Grd Beef	9		88.9%	0			0			9		88.9%
Grd Chick	0			0			0			0		
Grd Turkey	7		85.7%	0			0			7		85.7%

All Years 1998 - 2001												
Product	Large Establishments			Small Establishments			Very Small Establishments			All Sizes Establishments		
	#	Sets	% Pass	#	Sets	% Pass	#	Sets	% Pass	#	Sets	% Pass
Broilers	442		93.4%	142		84.5%	4		25.0%	588		90.8%
Market Hog	99		91.9%	69		73.9%	49		77.6%	217		82.9%
Cows/Bulls	7		100.0%	62		83.9%	17		76.5%	86		83.7%
Steer/Heif	8		100.0%	19		94.7%	4		100.0%	31		96.8%
Grd Beef	70		85.7%	796		91.0%	288		95.5%	1,154		91.8%
Grd Chick	6		100.0%	9		100.0%	1		100.0%	16		100.0%
Grd Turkey	49		91.8%	13		84.6%	1		100.0%	63		90.5%

^b Includes sample sets that completed during the indicated calendar year (sample sets may have started during an earlier year).