



Fig. S1 Schematic of CRISPR loci in *Salmonella* Typhimurium (oriented 5' to 3'). Direct repeats and spacers are represented by black diamonds and white rectangles, respectively. The terminal direct repeats are represented by white diamonds. L stands for leader sequence. *cas* genes are in grey while other core flanking genes (*ygcF*, *iap* and *ptsP*) are in white. The locations of PCR and flanking sequencing primers are indicated with arrows. The figure is not drawn to scale.

Supplemental Table S1

Accession	Submitted	Farm	Source	Final Allele	Std. Allele	CRISPR1 Allele	CRISPR2 Allele	CRISPR3/MSL1 (ST)	Ampicillin	Ceftriaxone	Chlortetracycline	Clindamycin	Doxiflaxacin	Fenofibrate	Fluorfenicol	Gentamicin	Neomycin	Oxytetracycline	Penicillin	Spectinomycin	Sulphonamides	Tiamulin	Tilmicosin	Trimethoprim/Sulphonamides	Toltriamazine	Tylosin (Tetracycline)
P060555	2/24/09	AJ	poultry (meat)	allele 9	allele 15	allele 11	allele 10	TST 10	R	S	R	NI	S	S	S	S	S	R	R	R	R	R	R	R	R	R
P090147	3/4/09	AJ	cattle	allele 8	allele 15	allele 11	allele 10	TST 10	R	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0901624	10/28/09	AK	swine	allele 8	allele 15	allele 11	allele 10	TST 10	R	S	R	NI	S	R	S	S	S	R	R	R	R	R	R	R	R	R
P1019624	7/28/10	AM	cattle	allele 8	allele 15	allele 11	allele 10	TST 10	R	S	R	NI	S	R	S	S	S	R	R	R	R	R	R	R	R	R
P1020529	8/6/10	AM	cattle	allele 8	allele 15	allele 11	allele 10	TST 10	R	S	R	NI	S	R	S	S	S	R	R	R	R	R	R	R	R	R
P1023387	9/7/10	AM	cattle	allele 8	allele 15	allele 11	allele 10	TST 10	R	S	R	NI	S	R	S	S	S	R	R	R	R	R	R	R	R	R
P123458	11/21/11	AO	poultry	allele 8	allele 15	allele 11	allele 10	TST 10	R	S	R	NI	S	R	S	S	S	R	R	R	R	R	R	R	R	R
P0903703	11/18/09	AS	cattle	allele 8	allele 15	allele 11	allele 10	TST 10	S	R	S	R	NI	S	R	S	S	S	R	R	R	R	R	R	R	R
P1026056	10/4/10	G	cattle	allele 8	allele 15	allele 11	allele 10	TST 10	R	S	R	NI	S	R	S	S	S	R	R	R	R	R	R	R	R	R
P1122481	9/2/11	GG	cattle	allele 8	allele 15	allele 11	allele 10	TST 10	R	R	R	NI	S	R	S	S	S	R	R	R	R	R	R	R	R	R
P0837179	9/14/08	H	cattle	allele 8	allele 15	allele 11	allele 10	TST 10	R	R	R	NI	S	R	S	S	S	R	R	R	R	R	R	R	R	R
P0930463	10/16/09	H	poultry	allele 8	allele 15	allele 11	allele 10	TST 10	R	S	R	NI	S	R	S	S	S	R	R	R	R	R	R	R	R	R
P0908862	4/7/10	IA	avian (Bench guinea fow)	allele 8	allele 15	allele 11	allele 10	TST 10	R	R	R	NI	S	R	S	S	S	R	R	R	R	R	R	R	R	R
P0920389	10/7/09	IB	piglet	allele 8	allele 15	allele 11	allele 10	TST 10	R	R	R	NI	S	R	S	S	S	R	R	R	R	R	R	R	R	R
P1130073	11/18/11	AR	cattle	allele 8	allele 15	allele 10	allele 14	TST 12	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R	R
P0837177	9/18/08	R	cattle	allele 6	allele 15	allele 10	allele 14	TST 12	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P1107219	3/28/11	AC	cattle	allele 6	allele 15	allele 129	allele 162	TST 13	R	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R	R
P1122935	9/8/11	AE	cattle	allele 6	allele 15	allele 129	allele 162	TST 13	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R	R
P1122148	8/30/11	AO	deer	allele 6	allele 15	allele 129	allele 162	TST 13	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0902275	6/22/09	N	cattle	allele 6	allele 15	allele 129	allele 162	TST 13	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P1025997	11/4/10	Y	poultry (broiler)	allele 6	allele 15	allele 129	allele 162	TST 13	R	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R	R
P1101337	1/17/11	Y	avian (commercial turkey meat)	allele 6	allele 15	allele 129	allele 162	TST 13	R	S	R	NI	S	1	R	S	S	R	R	R	R	R	R	R	R	R
P0826262	7/22/08	A	cattle	allele 6	allele 15	allele 129	allele 162	TST 17	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0834134	9/22/08	AF	cattle	allele 6	allele 15	allele 129	allele 162	TST 17	R	S	R	NI	S	1	R	S	S	R	R	R	R	R	R	R	R	R
P0836990	10/13/08	AF	cattle	allele 6	allele 15	allele 10	allele 167	TST 17	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0909065	1/19/09	M	cattle	allele 6	allele 15	allele 10	allele 167	TST 17	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P1017409	7/7/10	T	cattle	allele 6	allele 15	allele 10	allele 167	TST 17	R	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R	R
P1114278	6/14/11	AD	cattle	allele 6	allele 62	allele 10	allele 164	TST 19	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0811445	8/29/08	D	cattle	allele 6	allele 62	allele 10	allele 164	TST 19	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0817189	9/3/08	E	cattle	allele 6	allele 62	allele 10	allele 164	TST 19	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0834300	9/23/08	I	cattle	allele 6	allele 62	allele 10	allele 164	TST 19	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0840888	11/18/08	L	cattle	allele 6	allele 62	allele 10	allele 164	TST 19	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P102221	9/3/10	IA	avian (turkey value)	allele 6	allele 62	allele 10	allele 164	TST 19	S	S	S	R	NI	S	5	S	S	S	R	NI	R	R	R	R	R	R
P0922081	7/24/09	IA	cattle	allele 6	allele 62	allele 10	allele 164	TST 19	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0929020	10/24/09	P	cattle	allele 6	allele 62	allele 10	allele 164	TST 19	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P1010922	4/29/10	R	cattle	allele 6	allele 62	allele 10	allele 164	TST 19	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P1017919	7/12/10	U	cattle	allele 6	allele 62	allele 10	allele 164	TST 19	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P1024851	9/21/10	V	cattle	allele 6	allele 62	allele 10	allele 164	TST 19	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P1030514	11/16/10	Z	cattle	allele 6	allele 62	allele 10	allele 164	TST 19	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0902422	11/23/09	AB	cattle	allele 6	allele 15	allele 10	allele 181	TST 42	R	R	R	NI	S	R	R	R	R	R	R	R	R	R	R	R	R	R
P1117070	7/12/11	AN	none (water source)	allele 6	allele 15	allele 10	allele 181	TST 42	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0828226	8/6/08	B	cattle	allele 6	allele 15	allele 10	allele 181	TST 42	R	R	R	NI	S	R	R	R	R	R	R	R	R	R	R	R	R	R
P0811213	8/28/08	B	cattle	allele 6	allele 15	allele 10	allele 181	TST 42	R	R	R	NI	S	R	R	R	R	R	R	R	R	R	R	R	R	R
P0920267	9/11/09	B	cattle	allele 6	allele 15	allele 10	allele 181	TST 42	R	R	R	NI	S	R	R	R	R	R	R	R	R	R	R	R	R	R
P0900565	1/7/09	B	cattle	allele 6	allele 15	allele 10	allele 181	TST 42	R	R	R	NI	S	R	R	R	R	R	R	R	R	R	R	R	R	R
P0901238	1/13/09	B	cattle	allele 6	allele 15	allele 10	allele 181	TST 42	R	R	R	NI	S	R	R	R	R	R	R	R	R	R	R	R	R	R
P0811991	8/28/08	C	cattle	allele 6	allele 15	allele 10	allele 181	TST 42	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0832868	9/11/08	F	cattle	allele 6	allele 15	allele 10	allele 181	TST 42	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0833453	9/16/08	G	cattle	allele 6	allele 15	allele 10	allele 181	TST 42	S	S	R	R	NI	S	R	R	R	R	R	R	R	R	R	R	R	R
P0832954	9/11/08	G	cattle	allele 6	allele 15	allele 10	allele 181	TST 42	R	R	R	NI	S	R	R	R	R	R	R	R	R	R	R	R	R	R
P0836253	10/9/08	J	cattle	allele 6	allele 15	allele 10	allele 181	TST 42	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0838443	10/28/08	K	cattle	allele 6	allele 15	allele 10	allele 181	TST 42	S	S	S	R	NI	S	1	S	S	S	R	NI	S	R	R	R	R	R
P0809150	11/18/08	K	poultry (eggs)	allele 6	allele 15	allele 10	allele 181	TST 42	S	S	S	R	NI	S	1	S	S	S	R	NI	S	R	R	R	R	R
P0905145	2/24/09	IA	cattle	allele 6	allele 15	allele 10	allele 182	TST 43	R	S	R	NI	S	1	S	R	R	R	R	R	R	R	R	R	R	R
P0905347	2/24/09	IA	avian (pecking birds)	allele 7	allele 15	allele 144	allele 14	TST 44	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P0905277	3/5/09	IA	avian (pecking birds)	allele 7	allele 15	allele 144	allele 14	TST 44	S	S	S	R	NI	S	1	S	S	S	R	NI	S	R	R	R	R	R
P0907443	3/16/09	IA	avian (pecking birds)	allele 7	allele 15	allele 144	allele 14	TST 44	S	S	S	R	NI	S	1	S	S	S	R	NI	S	R	R	R	R	R
P0907344	3/16/09	IA	avian (pecking birds)	allele 7	allele 15	allele 144	allele 14	TST 44	S	S	S	R	NI	S	1	S	S	S	R	NI	S	R	R	R	R	R
P0907352	3/18/09	IA	avian (pecking birds)	allele 7	allele 15	allele 144	allele 14	TST 44	S	S	S	R	NI	S	1	S	S	S	R	NI	S	R	R	R	R	R
P0907096	4/14/09	IA	avian (red tailed hawks)	allele 7	allele 15	allele 144	allele 14	TST 44	S	S	S	R	NI	S	1	S	S	S	R	NI	S	R	R	R	R	R
P0904689	2/18/09	IA	avian (pecking birds)	allele 7	allele 15	allele 144	allele 14	TST 44	S	S	S	R	NI	S	1	S	S	S	R	NI	S	R	R	R	R	R
P1003347	2/9/10	Q	poultry (broiler)	allele 6	allele 15	allele 145	allele 183	TST 45	R	NA	S	NA	R	NA	S	1	S	S	S	R	R	R	NA	NA	NA	NA
P1003853	2/19/10	Q	poultry (broiler)	allele 6	allele 15	allele 145	allele 183	TST 45	NA	S	NA	R	NA	S	1	S	S	S	R	R	R	NA	NA	NA	NA	NA
P1016120	6/23/10	S	avian (commercial turkey meat)	allele 6	allele 15	allele 10	allele 184	TST 46	NA	S	NA	R	NA	S	1	S	S	S	R	R	R	NA	NA	NA	NA	NA
P1025715	9/29/10	W	cattle	allele 6	allele 62	allele 10	allele 185	TST 47	R	NI	S	1	S	S	1	S	S	S	R	R	R	R	R	R	R	R
P1025998	10/1/10	X	horse	allele 6	allele 15	allele 146	allele 184	TST 48	S	S	NA	NA	NA	S	NA	S	NA	NA	R	NA	NA	NA	NA	NA	NA	NA
P1106154	3/15/11	AA	cattle	allele 6	allele 15	allele 147	allele 164	TST 49	S	S	S	R	NI	S	1	S	S	S	R	R	R	R	R	R	R	R
P1107214	3/25/11	AB	cattle	allele 6	allele																					

Table S2 Names and sequences of all primers used for PCR and sequencing of CRISPR-MVSLT loci

Primer Name	Sequence (5' to 3')	Application
fimH-1	AGGTGAACTGTTTCATCCAGTGG	<i>fimH</i> PCR and sequencing
fimH-2	GCGGGCTGAACAAAACACAA	<i>fimH</i> PCR and sequencing
fimH-3	GCGCGTCGTTATTTAGTC	<i>fimH</i> internal sequencing
fimH-4	GGACAGGTCGTGGAGTTT	<i>fimH</i> internal sequencing
sseL-1	AAAATCAGGTCTATGCCTGATTTAATATATC	<i>sseL</i> PCR
sseL-3	ACCAGGAAACAGAGCAAAATGAATATATGT	<i>sseL</i> sequencing
sseL-4	TTCTCTCGTAAACTATCCTATTGGGC	<i>sseL</i> sequencing
sseL-5	GGCTCTAAGTACTCRCCATTACT	<i>sseL</i> PCR
CRISPR1-1	GATGTAGTGCGGATAATGCT	CRISPR1 PCR and sequencing
CRISPR1-5	GGTTTCTTTCTTCTCTGTTG	CRISPR1 PCR and sequencing
CRISPR1-8	GCCATTATCAACCCTCCAG	CRISPR1 internal sequencing
CRISPR1-9	TATCGTTAAGACTGAAGGAAG	CRISPR1 internal sequencing
CRISPR2-1	GCAATACCCTGATCCTTAACGCCA	CRISPR2 sequencing
CRISPR2-3	ATTGTTGCGATTATGTTGGT	CRISPR2 PCR and sequencing
CRISPR2-4	TCCAGCTCCCTTATGATTTT	CRISPR2 PCR
CRISPR2-5	CGACGAAATAAAACCGAACT	CRISPR2 internal sequencing
CRISPR2-6	CGGATTCCATGCGTTTTCA	CRISPR2 internal sequencing
CRISPR2-7	CCGGCGAGGTCAATAAAA	CRISPR2 internal sequencing
CRISPR2-8	TGACGCTGGTCTATACCG	CRISPR2 internal sequencing
CRISPR2-9	GTGACGTCAGTGCCGAA	CRISPR2 internal sequencing
CRISPR2-10	CTCTTCGCACTCTCGATCAA	CRISPR2 internal sequencing
CRISPR2-11	ACACAGCCCCGTCCAGAA	CRISPR2 internal sequencing
CRISPR2-12	AAGTTTGGGTAAATTGGACACG	CRISPR2 internal sequencing
CRISPR2-13	ACCGTGCAGAGTTGTATC	CRISPR2 internal sequencing
CRISPR2-14	TATTTGCTATCAGTTACATC	CRISPR2 internal sequencing
CRISPR2-15	AATCGCCAGCCTCGGAAATA	CRISPR2 internal sequencing
CRISPR2-16	TTTTTCTGTTCTGTTTCG	CRISPR2 internal sequencing
CRISPR2-17	CTAGGAGGCGTAATGAATAC	CRISPR2 internal sequencing
CRISPR2-18	ACGTGGTGGCCTCAAATAA	CRISPR2 internal sequencing
CRISPR2-19	AACGAACTGAATAAAATGTC	CRISPR2 internal sequencing
CRISPR2-20	GAAAGTGACGCGGCTTAT	CRISPR2 internal sequencing
CRISPR2-21	CGGCAGCGGTTGAGTAA	CRISPR2 internal sequencing
CRISPR2-22	CCACCAAAGCGAGAACAAA	CRISPR2 internal sequencing (targets IS10)
CRISPR2-23	GCCACGCATTACTTGACTGT	CRISPR2 internal sequencing (targets IS10)
CRISPR2-24	CGTTTTGATATCATGCTGCTAA	CRISPR2 internal sequencing (targets IS10)
CRISPR2-25	TTCCAGGCTAACACAGTCAGA	CRISPR2 internal sequencing (targets IS10)
CRISPR2-26	GGCTGTTTAGTTCTGTTGT	CRISPR2 internal sequencing

Table S3 Distribution of antibiotic resistance by TST

CRISPR-MVLST	Total Isolates Screened	Ampicillin		Ceftiofur		Chlorotetracycline		Gentamicin		Neomycin		Oxytetracycline		Trimethoprim/Sulphamethoxazole	
		R	S	R	S	R	S	R	S	R	S	R	S	R	S
TST 10	19	17	2	3	16	15	4	0	19	1	18	15	4	2	17
TST 13	12	3	9	0	12	3	9	3	9	0	12	3	9	0	12
TST 17	11	0	11	0	11	0	11	0	11	0	11	0	11	0	11
TST 19	18	1	17	1	17	0	18	0	18	0	18	0	18	0	17
TST 42	15	7	8	7	8	8	7	7	8	8	7	8	7	5	10
TST 44	8	0	8	0	8	0	8	0	8	0	8	0	8	0	8
		p<0.001		P=0.003		p<0.001		p<0.001		p<0.001		p<0.001		p=0.007	

The distribution of resistant and sensitive isolates for each of the seven antibiotics which significantly differed by sequence type is listed. The total isolates screened for TSTs 10, 13, 17, and 19 include 6 epidemiologically unlinked human clinical isolates in addition to all available isolates in the ADL collection, TST 42 includes only two clinical isolates, and no clinical isolates were identified with TST 44. P-values reflect the results of Fisher's exact test.