

The importance of using whole genome sequencing and extended spectrum beta-lactamase selective media when monitoring antimicrobial resistance.

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Supplementary material

Antimicrobial	Gene
Azithromycin	<i>ermB, mefB, mphA, mphB</i>
Cefotaxime, Ceftazidime, Ampicillin	<i>LAP-2, OXA-1, OXA-10, TEM-1a, TEM-1b, TEM-1c, TEM-1d, CMY-2, CTX-M-1, CTX-M-11, CTX-M-14, CTX-M-15, CTX-M-16, CTX-M-2, CTX-M-27, CTX-M-3, CTX-M-32, CTX-M-55, CTX-M-65, DHA-1, MOX-9, SHV-12, ampC promoter mutation</i>
Chloramphenicol	<i>catA1, catA2, catB7, cml, floR</i>
Ciprofloxacin, Nalidixic Acid	<i>gyrA mutation, parC mutation, qnrB1, qnrB19, qnrB4, qnrS1, aac6-lb-cr</i>
Gentamicin	<i>aac3-pEK516, aac3-IVa, aac3-VIa_c, aac6-lb3, aph3-IIb, aac3-IIId</i>
Sulphamethoxazole	<i>sul1, sul2, sul3</i>
Tetracycline	<i>tet-AB, tet-A, tet-B, tet-C</i>
Trimethoprim	<i>dfrA1, dfrA12, dfrA13, dfrA14, dfrA17, dfrA21, dfrA5, dfrA7, dfrA8, dfrB1</i>
Fosfomycin	<i>fosA3</i>
Kanamycin	<i>aph3-Ia, aph3-Ic</i>
Lincomycin	<i>lnuF</i>
Rifampicin	<i>arr-2</i>
Streptomycin and Spectinomycin	<i>strA, strB, aadA12, aadA17, aadA1b, aadA2, aadA22_b, aadA23, aadA24, aadA3, aadA5, aadA6/aadA10, aadA8, ant3-1a</i>
Streptothricin	<i>sat2A</i>

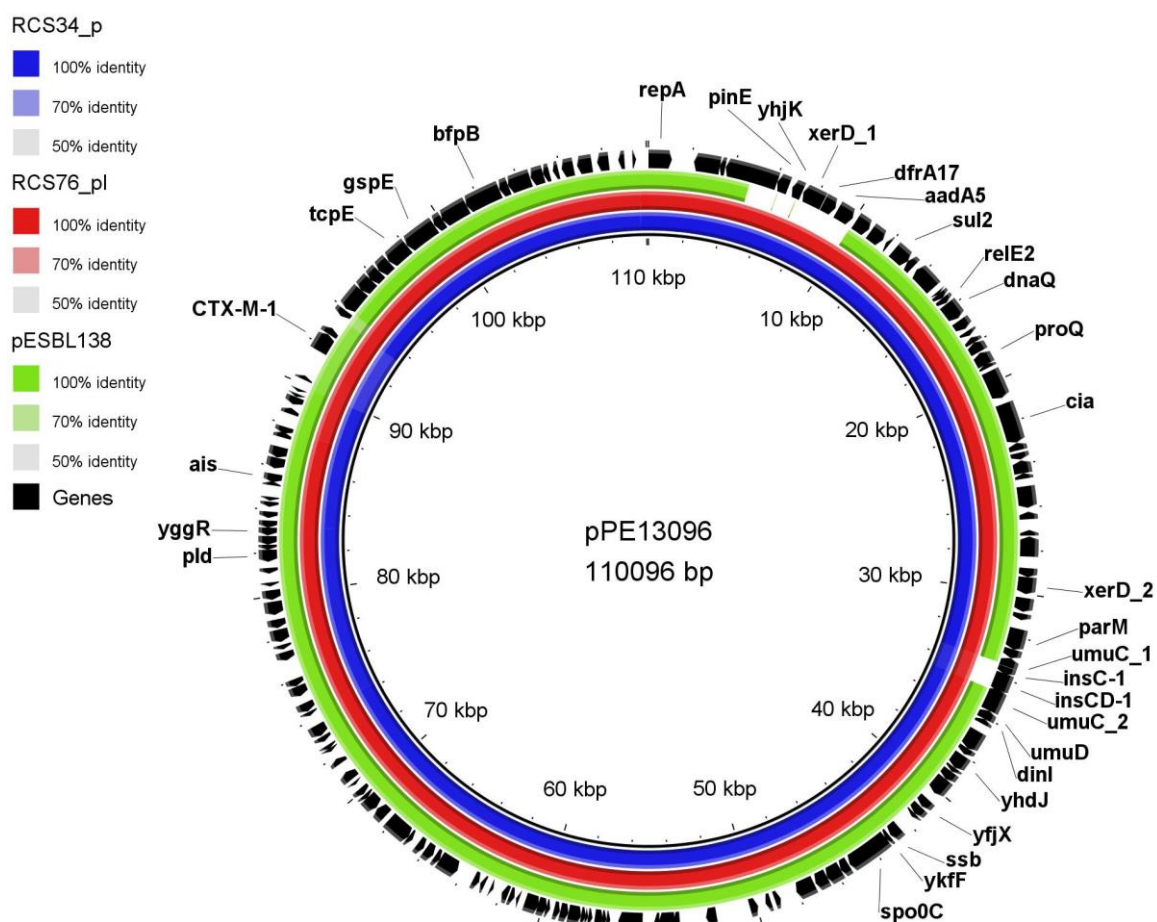
Table S1 – List of antimicrobials and their constituent genes that were identified in this study

	Gene	2013	2015		2017		Associated Plasmid Inc types identified
		CA-CTX and ESBL Brilliance (n=185/637)	ESBL Brilliance (n=96/313)	McC+CTX (n=89/313)	CA-ESBL (n=53/347)	McC+CTX (n=75/347)	
ESBL	CTX-M-1	76	64	51	64	44	IncI1, IncFII, IncB/O/K/Z
	CTX-M-2	1	4	2	0	1	-
	CTX-M-3	1	2	0	0	0	IncB/O/K/Z
	CTX-M-14	2	5	3	4	7	IncB/O/K/Z
	CTX-M-15	9	14	9	8	11	IncI1, IncFI, IncY
	CTX-M-27	1	0	1	2	0	-
	CTX-M-32	1	1	1	4	2	IncFI
	CTX-M-55	2	4	7	2	5	-
	CTX-M-65	0	0	1	2	0	IncFI
	CTX-M-115	0	0	0	2	1	-
	SHV-12	8	6	4	9	3	IncI1, IncX3
AmpC	CMY-2	0	0	9	1	16	IncI1
	DHA-1	0	0	3	0	0	-
	MOX-9	0	0	0	1	0	-
	AmpC mutation	1	1	8	2	11	N/A

Table S2 – AmpC/ESBL genes per year with the number of isolates from the total number of caecal samples recovered for each year.

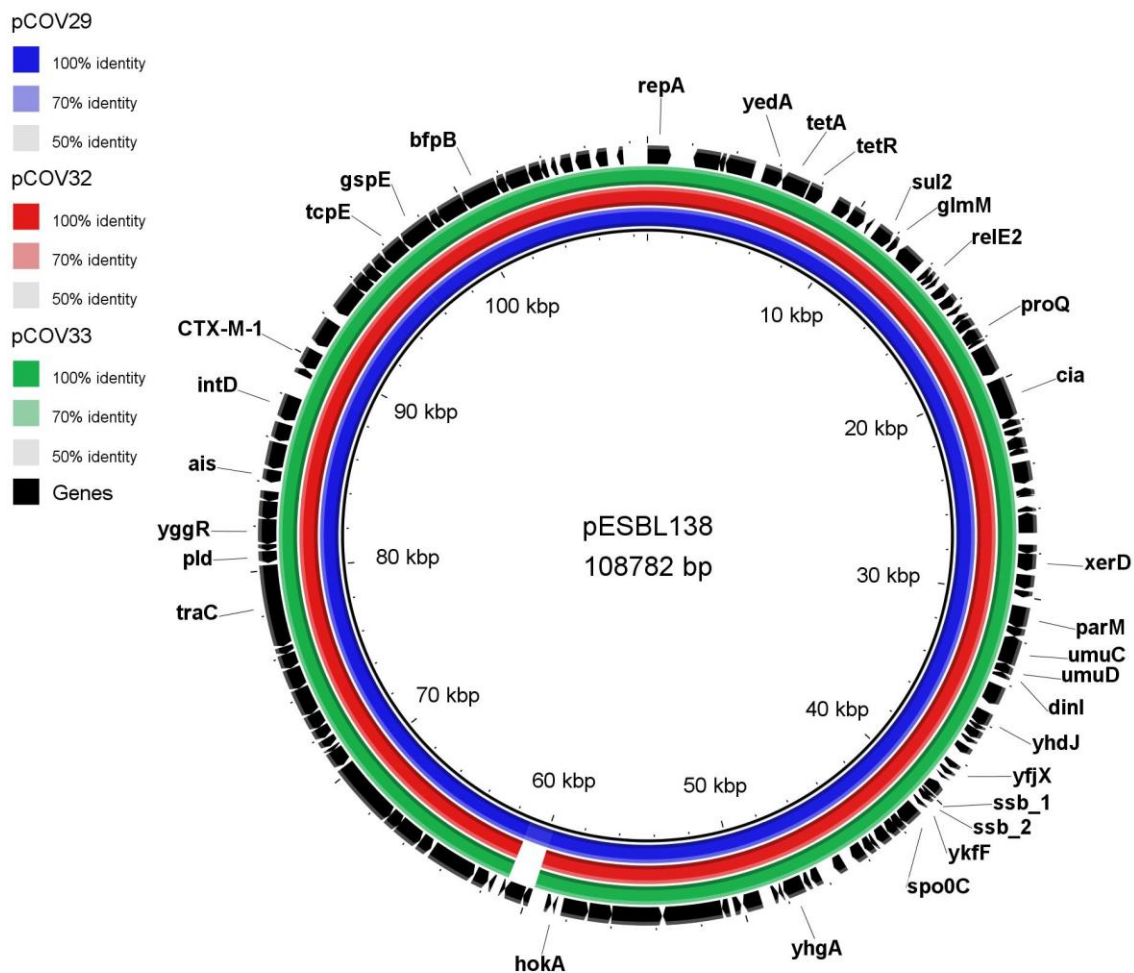
Antimicrobial		2013	2015		2017	
		CA-CTX and ESBL Brilliance (n=185/637)	ESBL Brilliance (n=96/313)	McC+CTX (n=89/313)	CA-ESBL (n=53/347)	McC+CTX (n=75/347)
EFSA	Ampicillin	100	100	100	100	100
	Cefotaxime/Ceftazidime	100	100	100	100	100
	Azithromycin	19	9	15	11	9
	Chloramphenicol	23	26	28	21	21
	Ciprofloxacin/Nalidixic acid	19	27	26	25	17
	Colistin	0	0	0	0	0
	Gentamicin	16	19	19	8	12
	Meropenem	0	0	0	0	0
	Sulphamethoxazole	85	88	79	83	75
	Tetracycline	75	79	79	83	67
	Tigecycline	0	0	0	0	0
	Trimethoprim	69	69	70	74	75
MDR [^]		98	95	94	100	89
Non-EFSA	Fosfomycin	2	1	1	0	3
	Kanamycin	5	5	7	4	7
	Lincomycin	2	2	4	2	1
	Spectinomycin/Streptomycin	81	80	76	85	80
	Streptothricin	7	5	4	13	9

Table S3 – Number of isolates out of total number of caecal samples examined per year/agar type with the proportion of isolates that contained genes that can confer resistance to the EFSA antimicrobial monitoring panel, other antimicrobials and the proportion of isolates that were MDR. [^]MDR was defined as the presence of genes conferring resistance to three or more of the EFSA panel groups as listed in the table.



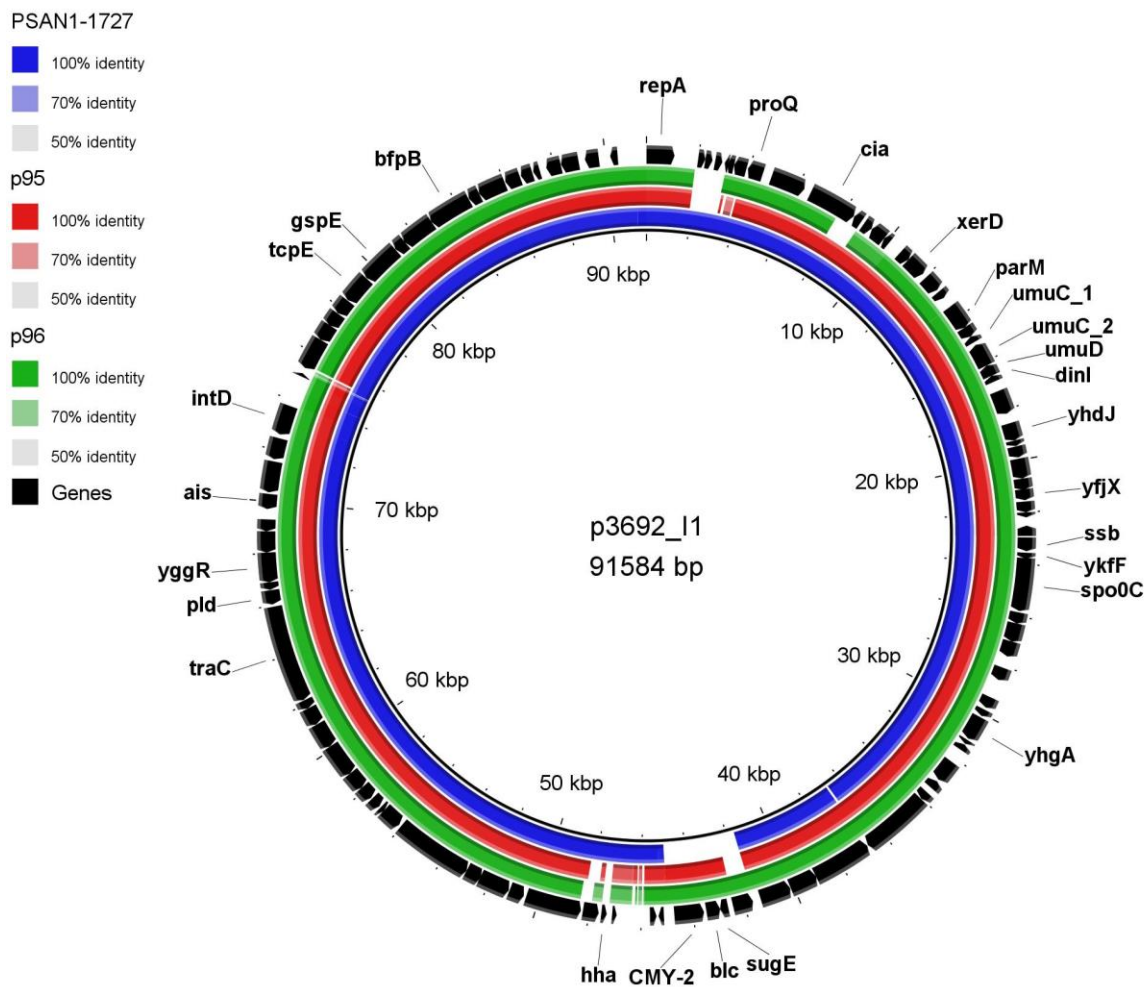
31 of the 31 labels are shown.

Figure S1 – Comparison of the bigger IncI1 plasmid (pPE13096) with those found in NCBI (RCS34_p and RCS76_pl) and the smaller, but more common, IncI1 plasmids in this study (pESBL138)



31 of the 31 labels are shown.

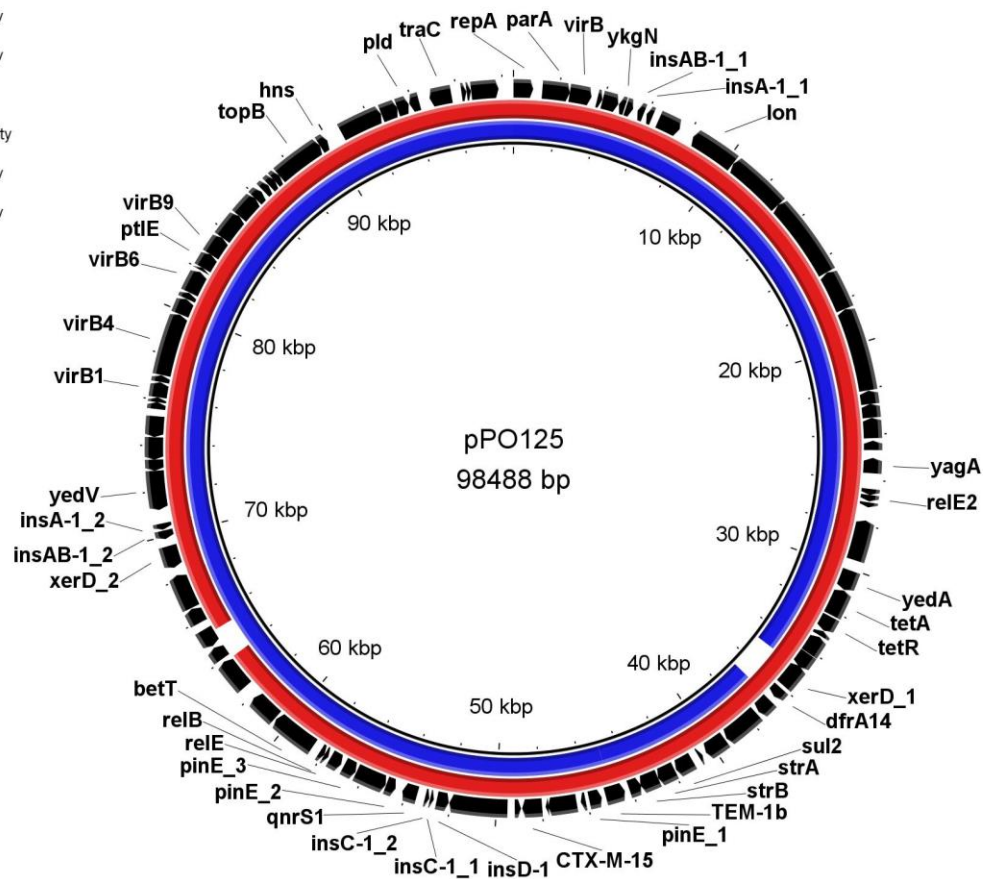
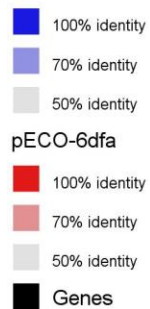
Figure S2 – pESBL138 compared to two plasmids isolated from broilers in France



27 of the 27 labels are shown.

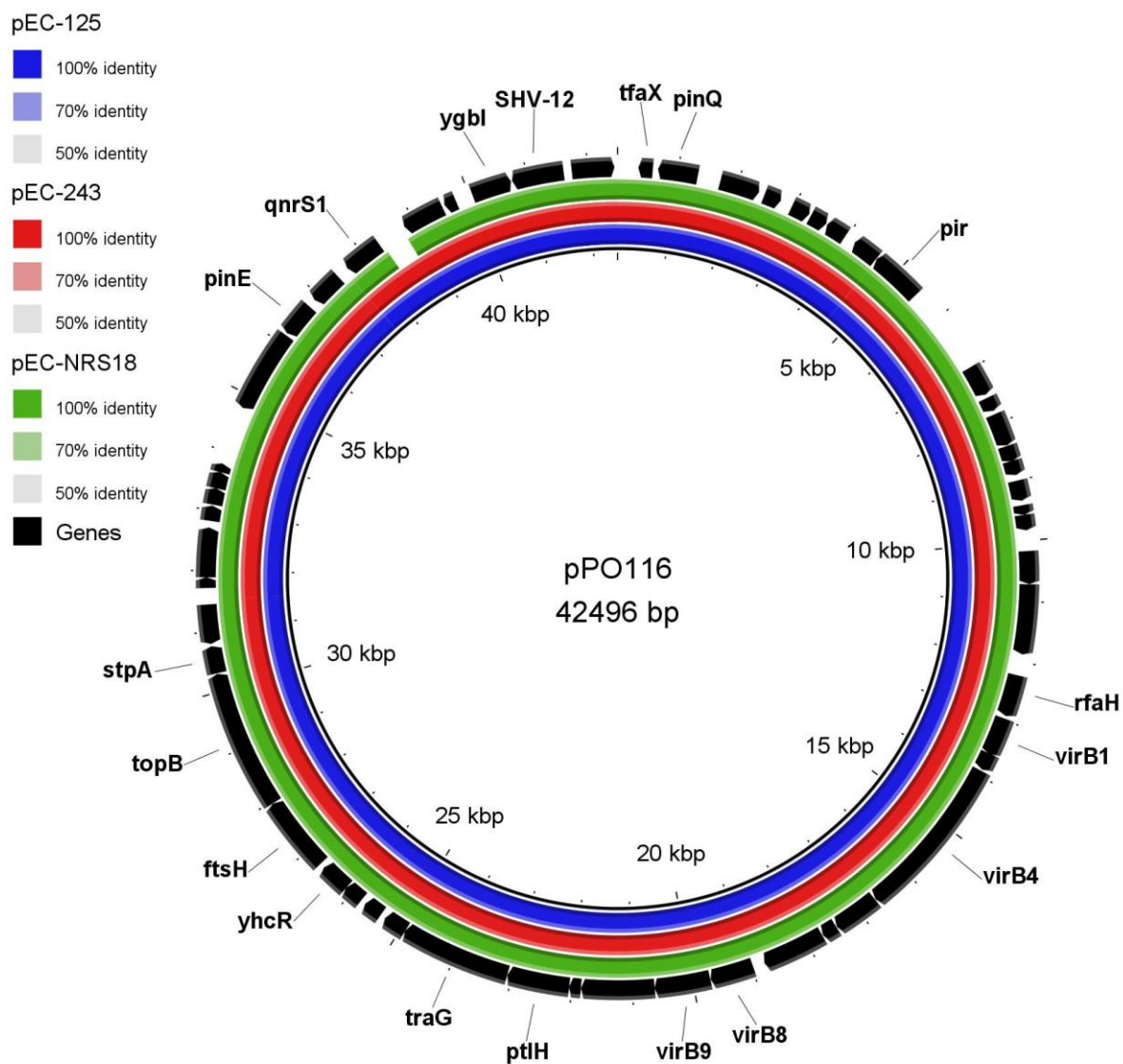
Figure S3 – p3682 compared to three plasmids. Of the plasmids (blue ring) was from a *Salmonella* from the USA, the backbone was the same but it was missing CMY-2.

tig000030506



42 of the 42 labels are shown.

Figure S4 – bla-CTX-M-15 on an IncY plasmid showing high similarity to isolates from an *E. coli* recovered from hospital plumbing from the USA.



18 of the 18 labels are shown.

Figure S5 – An IncX3 plasmid showing similarity to ones from the Netherlands that were isolated from a human and two from chicken faeces.