

Table S1. The first or latest cases of antibiotic resistance of chosen foodborne pathogens in different parts of the world

Kind of pathogens	Country	Source of isolation	Antibiotic resistance of strains	Genes responsible for resistance	References
<i>Campylobacter</i> spp.	Denmark	Humans, poultry, pigs	fluoroquinolones macrolides tetracyclines β -lactams	<i>gyrA</i> <i>ermB</i> , 23S rRNA, <i>rplD</i> , <i>rplV</i> <i>cmeA</i> , <i>cmeB</i> , <i>cmeC</i> <i>cmeR</i> <i>tet(O)</i> <i>bla</i> _{OXA-61}	Aarestrup and Engberg [257]
	Denmark, United States	Humans	fluoroquinolones macrolides	<i>gyrA</i> <i>ermB</i> , 23S rRNA, <i>rplD</i> , <i>rplV</i> <i>cmeA</i> , <i>cmeB</i> , <i>cmeC</i> <i>cmeR</i>	Engberg et al., [258]
	United Kingdom	Humans, poultry	fluoroquinolones	<i>gyrA</i>	Piddock, [259]
	Belgium, Canada, USA	Humans, sheep	tetracyclines	<i>tet(O)</i>	Taylor et al., [260]
	United Kingdom	Pigs	macrolides	<i>ermB</i> , 23S rRNA, <i>rplD</i> , <i>rplV</i>	Burridge et al., [261]
	Finland, Netherlands	Human, poultry	fluoroquinolones	<i>gyrA</i>	Rautelin et al., [262]; Endtz et al., [263]
	United States	Human	fluoroquinolones macrolides	<i>gyrA</i> <i>ermB</i> , 23S rRNA, <i>rplD</i> , <i>rplV</i>	Nachamkin et. al., [264]
<i>E.coli</i>	Poland	Poultry litter, cloaca and meat	ampicillin, moxycyline /clavulanic acid, doxycycline, ciprofloxacin, trimethoprim/sulfamethoxazole, gentamycin	<i>bla</i> _{TEM} , <i>bla</i> _{CTX-M} <i>tet(A)</i> , <i>tet(B)</i> <i>qnrA</i> , <i>qnrB</i> , <i>qnrS</i> , <i>sul1</i> , <i>sul2</i> , <i>sul3</i> , <i>dfr1</i> , <i>dfr5</i> , <i>dfr7/17</i> <i>strA-strB</i> , <i>aphA1</i> , <i>aac(3)-II</i>	Raciewicz et al. [265]
	Nepal	Humans,	ampicillin, ciprofloxacin, nalidixic acid, norfloxacin, ceftriaxone, cefixime, imipenem and meropenem	<i>bla</i> _{OXA-48}	Gurung et al. [266]

	Portugal, Spain, Ireland, Cyprus, Germany, Finland, Norway	Environemnt, wastewater, surface water	aminoglycosides, sulfonamides, tetracyclines, β -lactams, quinolones, amphenicols, vancomycin, multidrug resistance-MDR,	<i>aadA</i> and <i>strB</i> , <i>blaGES</i> , <i>blaOXA</i> , and <i>blaVEB</i> , <i>ereA</i> , <i>ermF</i> , <i>matA/mel</i> , <i>sul1</i> , <i>tetM</i> and <i>tetQ</i> , <i>qacEdelta1</i> , <i>qacH</i>	Pärnänen et al. [267]
	Italy	Humans	aminoglycosides, fluoroquinolones, β -lactams, including carbapenems	<i>blaTEM-1</i> , <i>blaOXA-1</i> , <i>blaOXA-9</i> , <i>blaCTX-M-15</i> , <i>tet(B)</i> , <i>tet(C)</i> , <i>armA</i> , <i>aac(6')-Ib-cr</i> , <i>aac(3)-II</i> , <i>catB3</i> , and <i>arr3</i> , , <i>aac(6')-Ib-cr</i> , <i>aac(3)-II</i> , <i>blaOXA-1</i> , <i>catB3</i> , <i>arr3</i> <i>blaNDM-1</i>	D'Andrea et al. [268]
	Australia	Dogs	tetracycline, enrofloxacin, ciprofloxacin, streptomycin, trimethoprim/sulfamethoxazole, ampicillin, ticarcillin, piperacillin, amoxicillin/clavulanic acid, ticarcillin/clavulanic acid	<i>blaTEM</i> , <i>blaCMY-7</i> , <i>catA1</i> , <i>dfrA17-aadA5</i> ,	Sidjabat et al. [269]
	South Africa	Poultry	doxycycline, trimethoprim-sulfamethoxazole, ampicillin, enrofloxacin	<i>mcr-1</i> , <i>mcr-2</i>	Hassan et al. [270]
	South Korea, China	Foods	trimethoprim-sulfamethoxazole, oxytetracycline, ampicillin, enrofloxacin, ciprofloxacin, chloramphenicol	<i>cmlA</i> , <i>cat-1</i> , <i>cat-2</i> , <i>cat-3</i> , <i>floR</i> .	Li et al. [271]
<i>E. faecium</i> , <i>E. faecalis</i>	Poland, Netherlands	Broiler chicks	lincomycin, erythromycin, tetracycline, ciprofloxacin,	<i>tet(M)</i> , <i>tet(L)</i> , <i>lnu(B)</i> , <i>erm(B)</i> , <i>Int-Tn</i> , <i>ant(4')-Ia</i> , <i>ant(6')-Ia</i> , <i>cat</i> ,	Stępień-Pyśniak et al. [67]
	Italy	Swine	florfenicol, chloramphenicol, tetracycline, streptomycine, kanamycin,	<i>optrA</i> , <i>cfrD</i> , <i>poxA</i>	Fioriti et al. [271]

				<i>aadA1</i> ,	
	China	Cattle- dairy cows	erythromycin, tetracycline, quinupristin/dalfopristin, rifampicin, chloramphenicol, ciprofloxacin	<i>tet(K), tet(L), tet(M), tet(O), tet(S)</i> <i>ermA, ermB, and ermC</i>	Yang et al. [272]
	Saudi Arabia	Humans	lincosamide (clindamycin), macrolides (erythromycin), quinolone, tetracycline, streptogramin	<i>vanA, tet(M), aph(3')-III, aac(6')-aph(2''), aad(6) mphD, erm(B), efrA, emeA, efrB, dfrE, dfrG</i>	Farman et al. [273]
	Iran		tetracycline, erythromycin,	<i>aac(6')-Ie-aph(2'')-Ia, aph(3')-IIIa, ant(4')-Ia</i>	Mirnejad et al.[274]
	Southern, West and Northern Africa	Humans,	erythromycin, kanamycin, gentamycin, tetracycline, streptomycin, trimethoprim/sulfamethoxazole vancomycin,	<i>erm(B), tet(M), vanA</i>	Osei Sekyere & Mensah, [275]
		Animals	clindamycin, ciprofloxacin, penicillin, trimethoprim/sulfamethoxazole		
		Environment	clindamycin, ciprofloxacin, erythromycin, penicillin, trimethoprim/sulfamethoxazole, vancomycin,		

<i>E. faecalis</i> , <i>E. faecium</i> , <i>E. durans</i>	Hungary	Cheese- sheep, goat	rifampicin vancomycin teicoplanin erythromycin, minocycline, nitrofurantoin, ciprofloxacin, levofloxacin	<i>ermA</i> , <i>ermB</i> , <i>ermC</i> , and <i>msrC</i>	Výrostková et al. [276]
<i>E. faecalis</i> , <i>E. faecium</i> , <i>E. hirae</i>	North America	Beef meat	lincomycin, quinupristin-dalfopristin, tetracycline, erythromycin, ciprofloxacin	<i>erm(B)</i> , <i>msrC</i> , <i>tet(B)</i> , <i>tet(C)</i> , <i>tet(L)</i> , <i>tet(M)</i> <i>vanA</i> , <i>vanB</i> , <i>vanC1</i> ,	Holman et al.[277]
<i>E. faecalis</i> , <i>E. faecium</i> , <i>E. casseliflavus</i> , <i>E. hirae</i>	South Africa-Egypt	Sheep, goats	oxacillin, vancomycin, linezolid	<i>blaZ</i> , <i>vanA</i> , <i>ermB</i> , <i>tet(M)</i> , <i>optrA</i>	El-Zamkan et al. [278]
<i>E. hirae</i> , <i>E. villorum</i> , <i>E. durans</i> , <i>E. faecium</i> , <i>E. malodoratus</i> , <i>E. faecalis</i> , <i>E. casseliflavus</i> , <i>E. mundtii</i> , <i>E. avium</i> , <i>E. columbae</i> , <i>E. gallinarum</i>	Canada	Humans, beef cattle, abattoirs, environment (streams, wastewater)	β-lactams, quinolones, tetracycline, macrolides, teicoplanin, vancomycin	<i>dfrE</i> , <i>lsa(A)</i> , , <i>erm(B)</i> , <i>ant(6)-Ia</i> , <i>aph(3')-IIIa</i> , <i>sat4</i> , <i>tet(L)</i> , <i>tet(M)</i> , <i>vanY</i> , <i>vanZ</i> , <i>vanA</i>	Zaheer et al. [279]
<i>L. monocytogenes</i>	France, Switzerland	Human-meningoencephalitis	chloramphenicol, erythromycin, streptomycin, tetracycline, minocycline	<i>cat221</i> , <i>ermAM</i> , <i>aad6</i> , <i>tet(S)</i> ; <i>tet(M)/int-Tn</i> , <i>tet(K)</i> , <i>tet(L)</i> , <i>tet(S)</i> ,	Charpentier & Courvalin,[168]
	Greece	Humans	chloramphenicol, clindamycin, gentamycin, streptomycin, tobramycin		

		Milk products	tetracycline	tet(M)	Filiousis et al. [280]
	South Africa	Environmemt-water	penicillin, cephalothin, ciprofloxacin, levofloxacin, tetracycline, trimethoprim/sulphamethoxazole, nalidixic acid, chloramphenicol, erythromycin, vancomycin, clindamycin, and oxacillin	<i>sulI</i> , <i>tet(A)</i> , <i>catII</i> , <i>blaTEM</i> , <i>blaSHV</i> , <i>blaOXA-1</i>	Mpondo et al. [281]
	Brazil	Food, food industry	cefoxitin, nalidix acid, clindamycin	<i>tet(M)</i> , <i>ermB</i>	Haubert et al.[183]
	United States	Natural environment, foods	cephalosporins, Streptomycin, tetracycline	<i>Tet(M)</i>	Bae et al. [186]
		Food- catfish fillets	cefotaxime, clindamycin	<i>tet(M)</i>	Chen et al.[282]
<i>L. monocytogenes</i> <i>L. seeligeri</i> , <i>L. welshimeri</i> , <i>L. ivanovii</i> , <i>L. innocua</i>					
<i>L. monocytogenes</i> <i>L. innocua</i>	Spain	ready-to-eat meat and dairy products	clindamycin, ciprofloxacin, ampicillin, tetracycline,	<i>mef A</i> , <i>msr A</i> , <i>erm A</i> , <i>erm B</i> , <i>lnu A</i> , <i>lnu B</i> , <i>tet (M)</i> , <i>tet(L)</i> ,	Escolar et al.[283]
<i>L. innocua</i> ,	Italy	Food	tetracycline	<i>tet (K)</i> , <i>tet(M)</i> , <i>tet (L)</i>	Roberts et al. [284]
<i>L. monocytogenes</i>		Food, human	tetracycline, erythromycine	<i>tet (S)</i>	

<i>L. welshimeri</i>		Food, environment, human disease	tetracycline	<i>tet (S), erm A, ermB, ermC</i>	
<i>Salmonella</i> spp	Uganda	Meat and milk samples	cefazolin, kanamycin, polymixin B, nitrofurantoin	<i>blaTem-2, aadA, bla-CTX-M-gr2, strA,</i>	Onohuean et al.[285]
	South Africa	Broiler chickens	tetracycline, trimethoprim/sulfamthoxazole, trimethoprim, kanamycin, gentamicin, ampicillin, amoxicillin, chloramphenicol, erythromycin, streptomycin	<i>tet (A), ant (3'')-la, tet B</i>	Zishiri et al.[286]
	Brazil	Fishes	amoxicillin/clavulanic acid, tetracycline, sulfonamide, chloramphenicol	<i>Tet(A), floR, sul2,</i>	Fereira et al.[287]
	Poland	Pork, poultry	penicillins, cephalosporins, aminoglycosides, fluorochinolones, sulfonamides, tetracyclines	<i>blaCMY-2, blaPSE-1 a, blaTEM, blaPSE-1, sul2, adfR, floR, tet(A), tet(B),</i>	Pławińska-Czarnak et al.[288]
	United States	Chicken, swine, turkey,	amoxicillin-clavulanic acid, ampicillin, cephalothin, cefoxitin, ceftiofur, ceftriaxone	<i>blaCMY, blaTEM, aphAI-IAB, strA, aadA1, aadA2, sul1, sul2, and/or sul3,</i>	Lyne et al.[289]
<i>S. Typhimurium, S. Typhi, S. Enteritidis, S. Rissen, S. Derby</i>	Italy	Pigs, slaughterhouse, pork meat	aminoglycoside (amikacin and tobramycin), gentamicin, tetracycline, ampicillin, piperacillin, trimethoprim, chloramphenicol, amoxicillin/ clavulanic acid, nitrofurantoin	<i>catA, nfsA, nfsB, par C, gyrA</i>	Lauteri et al.[290]

<i>S. Typhimurium</i> <i>S. Enteritidis</i> <i>S. Infantis</i>	Turkey	Poultry	tetracycline, trimethoprim/Sulfamethoxazole, ampicillin	<i>Tet(A)</i> , <i>sul1</i> , <i>blaTEM</i>	Arkali et al.[291]
<i>S. enteritidis</i>	Iran	Cattle	gentamicin, streptomycin, sulfamethoxazole, amikacin, ceftriaxone, imipenem	<i>blaIMP-1</i> , <i>tet(B)</i>	Ranjbar et al.[292]
<i>S. typhimurium</i>	Czech Republic	Pigs	streptomycin, sulphonamides, ampicillin, tetracycline, chloramphenicol	<i>blaPSE-1</i> , <i>floR</i> , <i>aadA2</i> , <i>sul1</i> , <i>tet(G)</i>	Sisak et al. [293]
<i>Staphylococcus aureus</i>	Poland	Poultry, slaughterhouses	penicillin G, amoxicillin, cefoxitin, amoxicillin + clavulanic acid, tetracycline, erythromycin, clindamycin	<i>mecA</i>	Marek et al.[294]
	Japan	Chicken, beef, pork meat	ampicillin, erythromycin, clindamycin, levofloxacin	<i>blaZ</i> , <i>erm(C)</i>	Osada et al.[295]
	Turkey	Human	oxacillin gentamicin erythromycin tetracycline penicillin	<i>mecA</i> <i>aac(6')/aph(2'')</i> , <i>aph(3'-IIIa)</i> , <i>ant(4')-Ia</i> <i>ermA</i> , <i>ermB</i> , <i>ermC</i> , and <i>msrA</i> <i>tet(K)</i> , <i>tet(M)</i> <i>blaZ</i>	Duran et al. [296]
		Humans,	erythromycin, ampicillin,	<i>mecA</i> , <i>erm(B)</i> , <i>erm(C)</i> , <i>vanB</i> , <i>vanA</i> , <i>vanC</i> ,	Osei Sekyere & Mensah, [275]

	Southern, West and Northern Africa		penicillin, trimethoprim/sulfamethoxazole, tetracycline	<i>tet(O), tet(M), tet(K), tet(L),</i>	
		Animals	penicillin, clindamycin, ampicillin, trimethoprim/sulfamethoxazole, vancomycin, erythromycin, ciprofloxacin		
		Environment	penicillin, sulfamethoxazole/trimethoprim, ampicillin, vancomycin, erythromycin, ciprofloxacin, clindamycin		
	Ethiopia	Human, vegetables	B-lactams, aminoglycosides, phenicols, lincosamides, macrolides, fluoroquinolones, tetracyclines, oxazolidinones, annamycin, sulfonamides, quinolones, glycopeptides, nitrofurantoin	<i>erm A, ermB, erm C, msrA</i>	Yigrem e2al.[297]
<i>S.haemolyticus</i>	India	Environment, foods	cefoxitin, erythromycin, co-trimoxazole, clindamycin, tetracyclines	<i>mecA dfrG, ermC, msrAB, cfr, tet(K),</i>	Manoharan et al.[298]
<i>Staphylococcus</i> spp.	Iran	Ready-to-eat food chicken, beef, plant	penicillin, tetracycline, gentamicin, erythromycin, trimethoprim-sulfamethoxazole, ciprofloxacin	<i>Tet(K), blaZ, aacA-D, gyrA, ermA</i>	Mesbah et al.[299]
<i>Staphylococcus</i> spp.	Czech Republic	Dairy milk and beef meat	erythromycin, penicillin, tetracycline,	<i>erm(A), erm(B), erm(C), mph(C) msr(A), mph(C)</i>	Schlegelova et al.[300]

<i>S. aureus</i> , <i>S. hyicus</i> , <i>S. epidermidis</i> , <i>S. lugdunensis</i> , <i>S. haemolyticus</i> , <i>S. hominus</i> , <i>S. schleiferi</i> , <i>S. cohnii</i> , <i>S. intermedius</i> , and <i>S. lentus</i>	Egypt	Chicken meat	penicillin, gentamycin, clindamycin, oxacillin, and sulfamethoxazole/trimethoprim	<i>mecA</i> , <i>gyrA</i> , <i>gyrB</i> , <i>grrA</i>	Osman et al.[301]
<i>S. epidermidis</i> , <i>S. intermedius</i> , <i>S. hyicus</i> , <i>S. aureus</i> , <i>S. caprae</i> , <i>S. gallinarum</i> , three <i>S. simulans</i> , <i>S. saprophyticus</i>	Brazil	Goat, sheep-mastitis	amoxicillin, streptomycin, tetracycline, lincomycin, erythromycin, rifampicin, oxacillin, norfloxacin, doxycycline, ciprofloxacin, enrofloxacin, gentamycin	<i>blaZ</i> , <i>ermA</i> , <i>ermB</i> , <i>ermC</i> , <i>icaD</i>	Franca et al. [302]

trimethoprim (*dfrA17* and *dfrA5*) and streptomycin/spectinomycin (*aadA5*); aminoglycosides (*aadA* and *strB*), β -lactams (*blaGES*, *blaOXA*, *blaVEB*), macrolide–lincosamide–streptogramin B (MLSB) (*ereA*, *ermF*, and *matA/mel*), sulfonamides (*sul1*), tetracyclines (*tet*), and multidrug resistance (*qacEdelta1* and *qacH*)