Annex B - Antimicrobial resistance in *Campylobacter* spp.

Annex to:

EFSA (European Food Safety Authority) and ECDC (European Centre for Disease Prevention and Control), 2022. **The European Union Summary Report on Antimicrobial Resistance in zoonotic and indicator bacteria from humans, animals and food in 2019/2020**. EFSA Journal 2022;20(3):7209, 198 pp. https://doi.org/10.2903/j.efsa.2022.7209

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B.1. Antimicrobial resistance in *Campylobacter* spp. from humans

Table 1: Antimicrobial resistance in *Campylobacter jejuni* from humans per country in 2020

Country	Gentamicin		Co-amoxiclav		Ciprofloxacin		Erythromycin		Tetracycline	
	N	% Res	N	% Res	N	% Res	N	% Res	N	% Res
Austria	397	0.00	-	-	397	74.8	397	0	397	46.9
Cyprus	-	-	-	-	17	100	17	0	17	58.8
Denmark	220	0.90	-	-	220	47.3	220	0	220	33.6
Estonia	249	0.40	-	-	249	79.1	249	0.4	249	48.6
Finland	-	-	-	-	1,339	42.4	1,353	1.2	816	28.4
France[a]	5,808	0.30	3,962	0	6,530	60.6	6,530	0.4	6,524	45.9
Italy	77	0	-	-	77	79.2	77	1.3	77	57.1
Luxembourg	199	0	200	0	200	72.5	200	0.5	200	50
Malta	2	NA	2	NA	138	79.7	138	0.7	1	NA
Netherlands[a]	-	-	-	-	1,270	61.4	1,250	2.3	1,126	50.4
Poland[a]	-	-	-	-	5	NA	28	10.7	5	NA
Portugal	227	0	-	-	227	89.90	227	2.2	227	73.1
Slovakia[a]	-	-	46	8.7	893	70.40	858	0.9	851	34.9
Slovenia	-	-	-	-	759	79.70	759	0.3	759	42.8
Spain	21	0	3	NA	21	100	21	0	21	52.4
Sweden[b]	-	-	-	-	323	17	323	0	323	10.8
Total (16 MSs)	7,200	0.3	4,213	0.1	12,665	61.2	12,647	0.7	11,813	43.7
Iceland	-	-	-	-	71	5.6	71	0	-	-
Norway	272	1.5	-	-	272	12.5	272	0.4	272	4.8

N: number of isolates tested; % Res: percentage of resistant isolates [note: in this report either interpreted as non-wild type by ECOFFs or clinically non-susceptible by combining resistant and intermediate categories]; –: no data reported; NA: not applicable – if fewer than 10 isolates were tested in an individual member state, resistance for that individual MS was not reported; PWA: population-weighted average; MSs: Member States.

(a): Provided interpreted SIR data. (b): Microbiological resistance predicted from whole genome sequencing (WGS)

Table 2: Antimicrobial resistance in *Campylobacter coli* from humans per country in 2020

Country	Gentamicin		Co-amoxiclav		Ciprofloxacin		Erythromycin		Tetracycline	
	N	% Res	N	% Res	N	% Res	N	% Res	N	% Res
Austria	40	0	-	-	40	62.5	40	0	40	60.0
Cyprus	-	-	-	-	6	NA	6	NA	6	NA
Estonia	28	0	-	-	28	85.7	28	7.1	28	64.3
Finland	-	-	-	-	97	85.6	100	43	79	72.2
France[a]	915	1.3	619	0.3	998	59.7	998	6.5	999	78.2
Italy	15	6.7	-	-	15	100.0	15	13.3	15	93.3
Luxembourg	26	0.0	26	15.4	26	69.2	26	11.5	26	73.1
Malta	4	NA	4	NA	34	79.4	34	5.9	3	NA
Netherlands[a]	-	-	-	-	115	67.8	113	20.4	108	71.3
Poland[a]	-	-	-	-	1	NA	8	NA	-	-
Portugal	38	0	-	-	38	89.5	38	36.8	38	86.8
Slovakia[a]	-	-	10	10.0	113	67.3	106	0.9	105	45.7
Slovenia	-	-	-	-	45	91.1	45	4.4	45	64.4
Spain	3	NA	-	-	3	NA	3	NA	3	NA
Sweden[b]	-	-	-	-	7	NA	7	NA	7	NA
Total (18 MSs)	**1,069**	**1.3**	**659**	**1.1**	**1,566**	**65.8**	**1,567**	**10**	**1,502**	**74.0**
Iceland	-	-	-	-	5	NA	5	NA	-	-
Norway	1	NA	-	-	1	NA	1	NA	1	NA

N: number of isolates tested; % Res: percentage of resistant isolates [note: in this report either interpreted as non-wild type by ECOFFs or clinically non-susceptible by combining resistant and intermediate categories]; –: no data reported; NA: not applicable – if fewer than 10 isolates were tested in an individual member state, resistance for that individual MS was not reported; MSs: Member States.
(a): Provided interpreted SIR data. (b): Microbiological resistance predicted from whole genome sequencing (WGS)

Table 3: Proportion of *Campylobacter jejuni* isolates from humans resistant to both ciprofloxacin (CIP) and erythromycin (ERY) per country in 2020

Country	Tested for CIP and ERY (N)	Resistant to both CIP and ERY (%)
Austria	397	0.0
Cyprus	17	0.0
Denmark	220	0.0
Estonia	249	0.4
Finland	1,328	1.2
France[a]	6,521	0.3
Italy	77	1.3
Luxembourg	200	0.5
Malta	138	0.0
Netherlands[a]	1,245	1.4
Poland[a]	5	NA
Portugal	227	2.2
Slovakia[a]	842	0.4
Slovenia	759	0.3
Spain	21	0.0
Sweden[b]	323	0.0
Total (19 MSs)	**12,569**	**0.5**
Iceland	71	0.0
Norway	272	0.4

N: number of isolates tested; NA: not applicable – if fewer than 10 isolates were tested in an individual member state, resistance for that individual MS was not reported; PWA: population-weighted average; MSs: Member States.
(a): Provided interpreted SIR data. (b): Microbiological resistance predicted from whole genome sequencing (WGS)

Table 4: Proportion of *Campylobacter coli* isolates from humans resistant to both ciprofloxacin (CIP) and erythromycin (ERY) per country in 2020

Country	Tested for CIP and ERY (N)	Resistant to both CIP and ERY (%)
Austria	40	0.0
Cyprus	6	NA
Estonia	28	7.1
Finland	96	40.6
France[(a)]	996	5.7
Italy	15	13.3
Luxembourg	26	11.5
Malta	34	2.9
Netherlands[(a)]	113	15.0
Poland[(a)]	1	NA
Portugal	38	36.8
Slovakia[(a)]	106	0.9
Slovenia	45	4.4
Spain	3	NA
Sweden[(b)]	7	NA
Total (15 MSs)	**1,554**	**8.9**
Iceland	5	NA
Norway	1	NA

N: number of isolates tested; NA: not applicable – if fewer than 10 isolates were tested in an individual member state, resistance for that individual MS was not reported; MSs: Member States.
(a): Provided interpreted SIR data. (b): Microbiological resistance predicted from whole genome sequencing (WGS)

Table 5: Complete susceptibility and multiresistance in *Campylobacter jejuni* from humans in 2020*

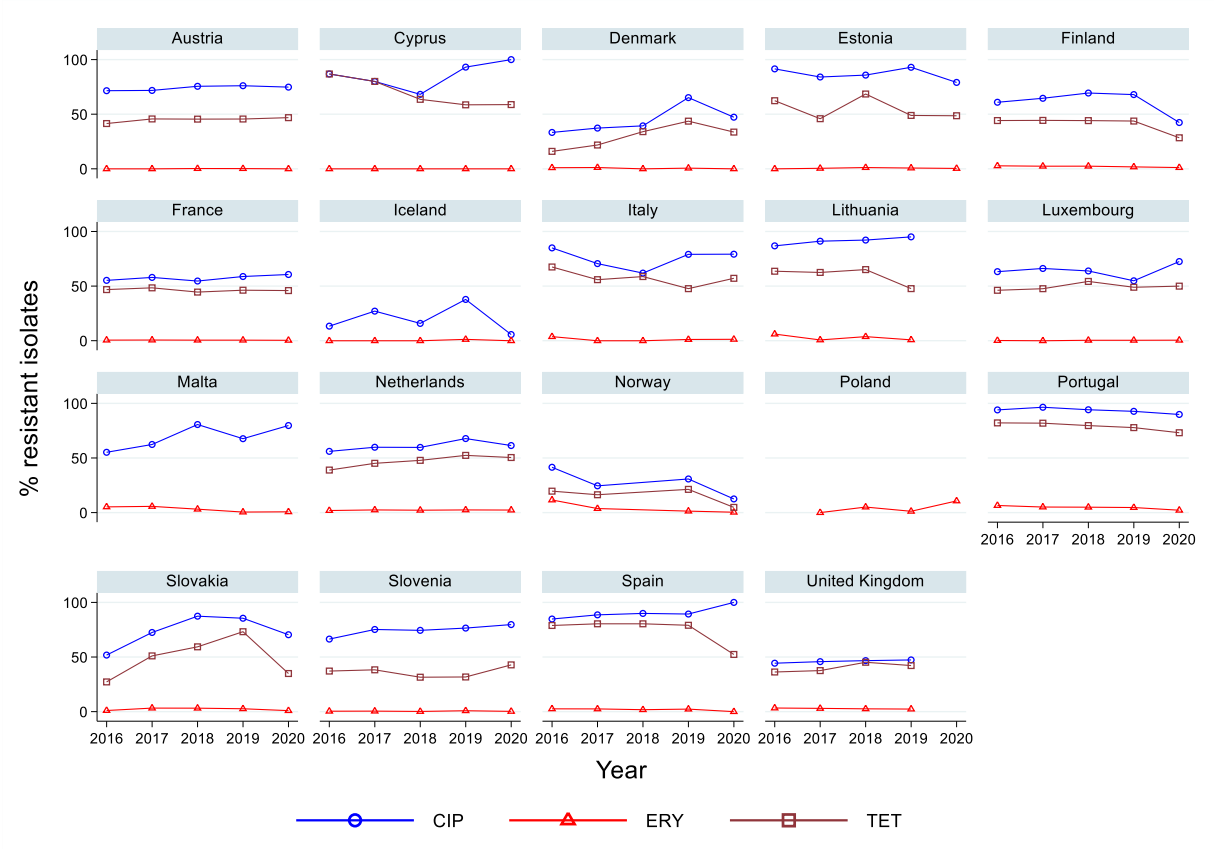
Country	Susceptible to all (%)	Multiresistant (%)
Austria (N=397)	22.4	0.0
Denmark (N=220)	49.5	0.9
Estonia (N=249)	20.1	0.4
France (N=5784)	30.8	0.3
Italy (N=77)	13.0	0.0
Luxembourg (N=199)	22.6	0.0
Malta (N=1)	NA	NA
Norway (N=272)	85.3	0.4
Portugal (N=227)	7.0	1.8
Spain (N=21)	0.0	0.0
Total (9 MSs+1 Non-MS) (N=7,447)	**31.3**	**0.3**

N: number of isolates tested; NA: not applicable – if fewer than 10 isolates were tested in an individual member state, resistance for that individual MS was not reported; MSs: Member States.
* in countries testing isolates for the harmonised panel of four antimicrobial classes.

Table 6: Complete susceptibility and multiresistance in *Campylobacter coli* from humans in 2020*

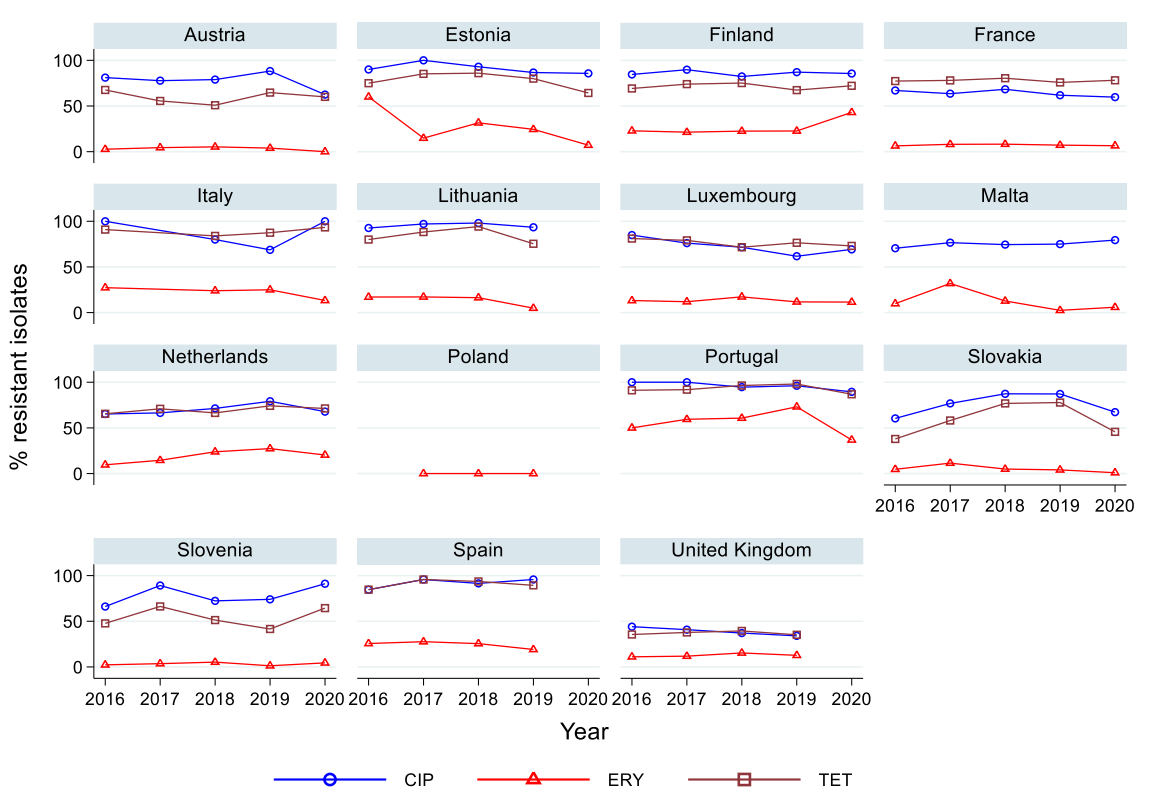
Country	Susceptible to all (%)	Multiresistant (%)
Austria (N=40)	20.0	0.0
Estonia (N=28)	14.3	7.1
France (N=913)	12.5	6.5
Italy (N=15)	0.0	13.3
Luxembourg (N=26)	19.2	11.5
Malta (N=3)	NA	NA
Norway (N=1)	NA	NA
Portugal (N=38)	5.3	36.8
Spain (N=3)	NA	NA
Total (8 MSs + 1 Non-MS) (N=1,067)	**12.5**	**7.5**

N: number of isolates tested; NA: not applicable – if fewer than 10 isolates were tested resistance was not calculated; MSs: Member States.
* in countries testing isolates for the harmonised panel of four antimicrobial classes.



CIP: ciprofloxacin; ERY: erythromycin; TET: tetracycline.

Figure 1: Trends in ciprofloxacin, erythromycin and tetracycline resistance in *Campylobacter jejuni* from humans in 19 reporting countries, 2016–2020



CIP: ciprofloxacin; ERY: erythromycin; TET: tetracycline.

Figure 2: Trends in ciprofloxacin, erythromycin and tetracycline resistance in *Campylobacter coli* from humans in 15 reporting countries, 2016–2020

B.2. Antimicrobial resistance in *Campylobacter* spp. from food-producing animals and derived meat

Table 1: Overview of data reported in 2019/2020

Year	Species	Origin	MSs	Non- MSs	Total
2020	*C. jejuni*	Caecal samples of broilers[m]	27 (N=3,382)	3 (N=441)	30 (N=3,822)
		Caecal samples of fattening turkeys[m]	9 (N=1,066)	2 (N=174)	11 (N=1,240)
		Carcase from broilers	4 (N=361)	1 (N=4)	4 (N=365)
		Fresh broiler meat	5 (N=343)	1 (N=112)	8 (N=455)
	C. coli	Caecal samples of broilers	7 (N=388)	1 (N=68)	8 (N=456)
		Caecal samples of fattening turkeys	3 (N=567)		3 (N=567)
2019	*C. jejuni*	Caecal samples of broilers	4 (N=501)		4 (N=501)
		Caecal samples of calves	4 (N=498)		4 (N=498)
		Carcase from broilers	5 (N=70)		5 (N=70)
		Fresh broiler meat	6 (N=399)		6 (N=399)
		Broiler meat preparation	3 (N=53)		3 (N=53)
	C. coli	Caecal samples of broilers	2 (N=201)		2 (N=201)
		Caecal samples of pigs	8 (N=1,174)	3 (N=481)	11 (N=1,655)
		Caecal samples of calves	2 (N=67)		2 (N=67)

m: mandatory; MSs: Member States; N: Total number of isolates reported by all MSs.
Data are reported for a category when they are reported for at least two countries and a total of 50 isolates

Table 2: Overview of data reported in 2020 for *C. coli* isolates from legislative categories, EU

EU/ NonEU	AMR species type	Origin	Origin detailed	N countries	Countries (number of isolates)
EU	animal	Pigs	Pigs - fattening pigs	1	CZ (1)
		Gallus gallus (fowl)	*Gallus gallus* (fowl) - broilers	7	CZ (86), FR (170), IE (42), LU (2), LV (3), NL (60), SI (25)
Non EU	animal	*Gallus gallus* (fowl)	*Gallus gallus* (fowl) - broilers	1	CH (68)

Table 3: Overview of data reported in 2020 for *C. jejuni* isolates from non-legislative categories, EU

EU/ NonEU	AMR species type	Origin	Origin detailed	N countries	Countries (number of isolates)
EU	animal	Pigs	Pigs - fattening pigs	1	CZ (1)
		Cattle (bovine animals)	Cattle (bovine animals) - calves (under 1 year)	1	DK (93)
			Cattle (bovine animals) - unspecified	1	FI (100)
		Gallus gallus (fowl)	*Gallus gallus* (fowl) - laying hens	1	NL (78)
	food	Meat from broilers (*Gallus gallus*)	Meat from broilers (*Gallus gallus*)	1	IT (70)
			Meat from broilers (*Gallus gallus*) - carcase	4	HR (85), DE (201), NL (63), RO (12)
			Meat from broilers (*Gallus gallus*) - fresh - chilled	5	AT (94), BE (7), DE (164), LU (29), NL (49)

			Meat from broilers (*Gallus gallus*) - meat preparation	2	LU (4), NL (31)
			Meat from *broilers* (*Gallus* gallus) - meat products	1	LU (1)
		Meat from turkey	Meat from turkey	1	IT (20)
			Meat from turkey - fresh	3	AT (11), LU (10), NL (3)
			Meat from turkey - meat preparation	1	LU (1)
		Meat from other poultry species	Meat from other poultry species – meat preparation	1	LU (3)
			Meat from other poultry species - meat products	1	LU (1)
		Mushrooms	Mushrooms	1	NL (1)
		Vegetables	Vegetables - pre-cut	1	NL (1)
		Meat from poultry, unspecified	Meat from poultry, unspecified - fresh	1	BE (59)
Non EU	animal	*Gallus gallus* (fowl)	*Gallus gallus* (fowl) - broilers	1	IS (3)
	food	Meat from broilers (*Gallus gallus*	Meat from broilers (*Gallus gallus*) - fresh - chilled	1	CH (112)

Table 4: Overview of data reported in 2020 for *C. coli* isolates from non-legislative categories, EU

Origin	Origin detailed	N countries	Countries (number of isolates)
Pigs	Pigs - fattening pigs	1	NL (45)
Gallus gallus (fowl)	*Gallus gallus* (fowl) - broilers	1	DE (58)
	Gallus gallus (fowl) - laying hens	1	NL (107)
Turkeys	Turkeys - fattening flocks	3	ES (94), FR (171), DE (302)
Meat from broilers (Gallus gallus)	Meat from broilers (*Gallus gallus*) - carcase	4	DE (53), LU (2), NL (13), RO (8)
	Meat from broilers (*Gallus gallus*) – fresh	6	AT (26), BE (3), SE (16), DE (37), LU (17), NL (16)
	Meat from broilers (*Gallus gallus*) - meat preparation	1	NL (17)
Meat from turkey	Meat from turkey – fresh	2	AT (13), LU (12)
	Meat from turkey - meat preparation	1	LU (1)
Meat from poultry, unspecified	Meat from poultry, unspecified - fresh	1	BE (13)
Meat, mixed meat -	Meat, mixed meat - meat products	1	BE (1)
Vegetables	Vegetables - pre-cut	1	NL (1)

Table 5: Occurrence of resistance (%) to selected antimicrobials in *Campylobacter coli* from pigs, using harmonised ECOFFs, 8 EU MSs and 3 non-MSs, 2019

Country	N	GEN (%)	STR (%)	NAL (%)	CIP (%)	ERY (%)	TET (%)
Czechia	307	0.3	74.3	47.6	50.5	7.2	76.9
Estonia	66	0.0	72.7	39.4	39.4	0.0	51.5
Germany	258	0.4	76.7	55.0	55.0	7.0	72.9
Ireland	170	0.0	67.6	32.3	32.3	14.7	69.4
Luxembourg	33	0.0	69.7	66.7	54.5	15.1	69.7
Slovenia	50	8.0	58.0	82.0	84.0	6.0	44.0
Spain	119	12.6	84.9	95.8	95.8	48.7	97.5
Sweden	171	0.0	46.8	36.8	36.8	0.0	0.0
Total (8 MSs)	**1,174**	**1.8**	**70.0**	**51.9**	**52.4**	**11.2**	**62.8**
Norway	249	0.0	41.0	15.7	15.7	0.0	0.4
Republic of North Macedonia	3	33.3	100.0	33.3	33.3	0.0	33.3
Switzerland	229	0.0	84.7	55.9	55.9	3.9	63.3

ECOFFs: epidemiological cut-off values; MS: Member States; N: number of isolates tested; CIP: ciprofloxacin; ERY: erythromycin; GEN: gentamicin; NAL: nalidixic acid; STR: streptomycin; TET: tetracycline.

Table 6: Occurrence of resistance (%) to selected antimicrobials in *Campylobacter coli* from calves, using harmonised ECOFFs, 2 EU MSs, 2019

Country	N	GEN (%)	STR (%)	NAL (%)	CIP (%)	ERY (%)	TET (%)
Germany	46	2.2	58.7	80.4	80.4	19.6	93.5
Spain	21	28.6	80.9	80.9	80.9	33.3	95.2
Total (2 MSs)	**67**	**10.4**	**65.7**	**80.6**	**80.6**	**23.9**	**94.0**

ECOFFs: epidemiological cut-off values; MSs: Member States; N: number of isolates tested; CIP: ciprofloxacin; ERY: erythromycin; GEN: gentamicin; NAL: nalidixic acid; STR: streptomycin; TET: tetracycline

Table 7: Occurrence of resistance (%) to selected antimicrobials in indicator *Campylobacter jejuni* from calves, using harmonised ECOFFs, 4 EU MSs, 2019

Country	N (%)	GEN (%)	STR (%)	NAL (%)	CIP (%)	ERY (%)	TET (%)
Denmark	114	0.0	2.6	20.2	20.2	0.0	10.5
Germany	131	0.0	10.7	60.3	61.1	0.0	80.1
Italy	106	9.4	13.2	68.9	69.8	0.0	95.3
Spain	147	0.7	26.5	70.7	72.1	0.0	72.8
Total (4 MSs)	**498**	**2.2**	**14.1**	**56.0**	**56.8**	**0.0**	**65.3**

Table 8: Occurrence of resistance (%) to selected antimicrobials in indicator *Campylobacter jejuni* from broilers, using harmonised ECOFFs, 27 EU MSs and 3 non-MSs, 2020

Country	N	GEN (%)	STR (%)	NAL (%)	CIP (%)	ERY (%)	TET (%)
Austria	177	0	22.6	72.3	78.0.	0	45.2
Belgium	92	0	15.2	64.1	64.1	0	54.4
Bulgaria	85	0	21.2	77.7	76.5	0	48.2
Croatia	85	0	16.5	84.7	84.7	0	47.1
Cyprus	74	0	16.2	77	87.8	6.8	58.1
Czechia	174	0	14.9	78.2	80.5	1.2	40.8
Denmark	163	0	17.2	38	38	0	34.4
Estonia	10	0	20	80	80	0	10
Finland	87	0	0	3.5	3.5	0	2.3
France	171	0	0	65.5	67.8	0	63.7
Germany	217	0	35	82	83.4	0	67.7
Greece	98	0	10.2	75.5	94.9	0	59.2
Hungary	170	0	13.5	91.8	91.8	0	60
Ireland	165	0	0.6	24.9	24.9	0	38.2
Italy	178	0	0	63.5	89.9	1.7	69.1
Latvia	47	0	53.2	100	100	0	19.1
Lithuania	84	0	40.5	86.9	88.1	1.2	66.7
Luxembourg	2	0	50	100	100	0	50
Malta	2	0	0	0	0	0	0
Netherlands	167	0	24.6	67.1	68.9	0	56.3
Poland	179	0	41.3	95.5	95.5	0	77.6
Portugal	110	0	6.4	90	93.6	6.4	89.1
Romania	322	1.2	9.9	80.4	82.0.	2.2	57.4
Slovakia	85	0	28.2	87.1	88.2	1.2	58.8
Slovenia	85	0	11.8	67.1	82.4	0	45.9
Spain	170	0	8.2	84.1	84.7	0	68.2
Sweden	183	0	0	20.8	20.8	0	4.9
Total (27 MS)	**3,382**	**0.1**	**15.6**	**69.2**	**72.8**	**0.8**	**52.7**
Norway	83	0	4.8	6	4.8	0	1.2
Switzerland	179	0	4.5	48	47.5	0	30.2
United Kingdom	179	0	0.6	59.8	59.2	0.6	66.5
Total (3 non-MS)	**441**	**0**	**3.0**	**44.9**	**44.2**	**0.2**	**39.5**

ECOFFs: epidemiological cut-off values; MS: Member States; N: number of isolates tested; CIP: ciprofloxacin; ERY: erythromycin; GEN: gentamicin; NAL: nalidixic acid; STR: streptomycin; TET: tetracycline.

Table 9: Occurrence of resistance (%) to selected antimicrobials in *Campylobacter jejuni* from fattening turkeys, using harmonised ECOFFs, 9 EU MSs and 2 non-MSs, 2020

Country	N	GEN (%)	STR (%)	NAL (%)	CIP (%)	ERY (%)	TET (%)
Austria	77	0.0	9.1	54.6	61.0	0.0	29.9
France	163	0.0	1.8	56.4	60.1	0.0	56.4
Germany	189	0.0	15.3	70.9	73.0	0.0	46.6
Hungary	170	0.00	9.4	87.7	88.2	0.0	57.6
Italy	168	0.6	1.8	50.0	75.6	1.8	72.0
Poland	180	0.0	27.8	89.4	93.3	0.0	62.2
Portugal	37	0.0	10.8	70.3	83.8	16.2	86.5
Romania	6	0.0	0.0	100.0	100.0	0.0	83.3
Spain	76	0.0	13.26	82.9	85.5	0.0	69.7
Total (9 MS)	**1,066**	**0.1**	**11.4**	**71.0**	**77.9**	**0.8**	**58.5**
Norway	5	0.0	20.0	0.0	0.0	0.0	0.0
United Kingdom	169	0.0	1.8	35.5	36.7	0.6	39.6
Total (2 non-MS)	**174**	**0.0**	**2.3**	**34.5**	**35.6**	**0.6**	**38.5**

ECOFFs: epidemiological cut-off values; MSs: Member States; N: number of isolates tested; CIP: ciprofloxacin; ERY: erythromycin; GEN: gentamicin; NAL: nalidixic acid; STR: streptomycin; TET: tetracycline.

Table 10: Occurrence of resistance (%) to selected antimicrobials in indicator *Campylobacter coli* from broilers, using harmonised ECOFFs, 7 EU MSs and 1 non-MS, 2020

Country	N	GEN (%)	STR (%)	NAL (%)	CIP (%)	ERY (%)	TET (%)
Czechia	86	0.0	24.4	80.2	84.9	12.8	60.5
France	170	0.0	10.0	47.1	46.5	2.4	90.6
Ireland	42	0.0	21.4	16.7	16.7	0.0	7.1
Latvia	3	0.0	0.0	100.0	100.0	33.3	66.7
Luxembourg	2	0.0	50.0	100.0	100.0	0.0	100.0
Netherlands	60	0.0	10.0	91.7	91.7	1.7	61.7
Slovenia	25	0.0	40.0	84.0	84.0	0.0	44.0
Total (7 MS)	**388**	**0.0**	**16.5**	**61.1**	**61.9**	**4.4**	**67.3**
Switzerland	68	2.9	48.5	52.9	51.5	7.4	52.9
Total (1 non-MS)	**68**	**2.9**	**48.5**	**52.9**	**51.5**	**7.4**	**52.9**

ECOFFs: epidemiological cut-off values; MSs: Member States; N: number of isolates tested; CIP: ciprofloxacin; ERY: erythromycin; GEN: gentamicin; NAL: nalidixic acid; STR: streptomycin; TET: tetracycline

Table 11: Percentage of *Campylobacter jejuni* isolates from broilers completely susceptible, multiresistant and co-resistant to both ciprofloxacin and erythromycin, per reporting country, 2020

Country	N	n completely susceptible	%	n Multiresistant	%	n Resistant to both CIP and ERY	%
Austria	177	36	20.3	0	0.0	0	0.0
Belgium	92	28	30.4	0	0.0	0	0.0
Bulgaria	85	15	17.7	0	0.0	0	0.0
Croatia	85	8	9.4	0	0.0	0	0.0
Cyprus	74	4	5.4	4	5.4	4	5.4
Czechia	174	30	17.2	2	1.2	2	1.2
Denmark	163	96	58.9	0	0.0	0	0.0
Estonia	10	2	20.0	0	0.0	0	0.0
Finland	87	82	94.3	0	0.0	0	0.0
France	171	30	17.5	0	0.0	0	0.0
Germany	217	31	14.29	0	0.0	0	0.0
Greece	98	3	3.1	0	0.0	0	0.0
Hungary	170	9	5.3	0	0.0	0	0.0
Ireland	165	86	52.1	0	0.0	0	0.0
Italy	178	15	8.4	3	1.7	3	1.7
Latvia	47	0	0.0	0	0.0	0	0.0
Lithuania	84	10	11.9	1	1.2	1	1.19
Luxembourg	2	0	0.0	0	0.0	0	0.0
Malta	2	2	100.0	0	0.0	0	0.0
Netherlands	167	51	30.5	0	0.0	0	0.0
Poland	179	7	3.9	0	0.0	0	0.0
Portugal	110	3	2.7	7	6.4	7	6.4
Romania	322	44	13.66	8	2.5	7	2.2
Slovakia	85	8	9.4	1	1.2	1	1.2
Slovenia	85	15	17.7	0	0.0	0	0.0
Spain	170	19	11.2	0	0.0	0	0.0
Sweden	183	144	78.7	0	0.0	0	0.0
Total (27 MS)	**3,382**	**778**	**23.0**	**26**	**0.8**	**25**	**0.7**
Norway	83	77	92.8	0	0.0	0	0.0
Switzerland	179	81	45.3	0	0.0	0	0.0
United Kingdom	179	45	25.1	0	0.0	0	0.0
Total (3 non-MS)	**441**	**203**	**46.0**	**0**	**0.0**	**0**	**0.0**
Total (EU MS and non-MS)	**3,823**	**981**	**25.7**	**26**	**0.7**	**25**	**0.7**

Complete susceptibility is defined as susceptibility to ciprofloxacin, nalidixic acid, erythromycin, gentamicin and tetracycline. MDR is defined as resistance to at least three antimicrobial substances (ciprofloxacin or nalidixic acid/ erythromycin/ gentamicin/ tetracycline).

Table 12: Percentage of *Campylobacter coli* isolates from broilers completely susceptible, multiresistant to three or more antimicrobials and co-resistant to both ciprofloxacin and erythromycin, per reporting country, 2020

Country	N	n completely susceptible	%	n multiresistant	%	n Resistant to both CIP and ERY	%
Czechia	86	3	3.5	11	12.8	11	12.8
France	170	12	7.1	3	1.8	3	1.8
Ireland	42	33	78.6	0	0.0	0	0.0
Latvia	3	0	0.0	0	0.0	1	33.3
Luxembourg	2	0	0.0	0	0.0	0	0.0
Netherlands	60	3	5.0	1	1.7	1	1.7
Slovenia	25	2	8.0	0	0.0	0	0.0
Total (7 MS)	**388**	**53**	**13.7**	**15**	**3.9**	**16**	**4.1**
Switzerland	68	19	27.9	5	7.4	5	7.4
Total (1 non-MS)	**68**	**19**	**27.9**	**5**	**7.4**	**5**	**7.4**
Total (EU MS and non-MS)	**456**	**72**	**15.8**	**20**	**4.4**	**21**	**4.6**

N: total number of isolates; n: number of isolates
Complete susceptibility is defined as susceptibility to ciprofloxacin, nalidixic acid, erythromycin, gentamicin and tetracycline. MDR (multidrug resistance) is defined as resistance to at least three antimicrobial substances (ciprofloxacin or nalidixic acid/ erythromycin/ gentamicin/ tetracycline).

Table 13: Percentage of *Campylobacter jejuni* isolates from fattening turkey flocks completely susceptible, multiresistant to three or more antimicrobials and co-resistant to both ciprofloxacin and erythromycin, per reporting country, 2020

Country	N	n completely susceptible	%	n Multiresistant	%	n Resistant to both CIP and ERY	%
Austria	77	28	36.4	0	0.0	0	0.0
France	163	46	28.2	0	0.0	0	0.0
Germany	189	47	24.9	0	0.0	0	0.0
Hungary	170	8	4.7	0	0.0	0	0.0
Italy	168	29	17.3	3	1.8	2	1.2
Poland	180	10	5.6	0	0.0	0	0.0
Portugal	37	4	10.8	6	16.2	6	16.2
Romania	6	0	0.0	0	0.0	0	0.0
Spain	76	7	9.2	0	0.0	0	0.0
Total (9 MS)	**1,066**	**179**	**16.8**	**9**	**0.8**	**8**	**0.8**
Norway	5	5	100.0	0	0.0	0	0.0
United Kingdom	169	91	53.9	0	0.0	0	0.0
Total (2 non-MS)	**174**	**96**	**55.2**	**0**	**0.0**	**0**	**0.0**
Total (EU MS and non-MS)	**1,240**	**275**	**22.2**	**9**	**0.7**	**8**	**0.7**

N: total number of isolates; n: number of isolates
Complete susceptibility is defined as susceptibility to ciprofloxacin, nalidixic acid, erythromycin, gentamicin and tetracycline. MDR is defined as resistance to at least three antimicrobial substances (ciprofloxacin or nalidixic acid/ erythromycin/ gentamicin/ tetracycline).

Table 14: Percentage of *Campylobacter coli* isolates from fattening turkey flocks completely susceptible, multiresistant to three or more antimicrobials and co-resistant to both ciprofloxacin and erythromycin, per reporting country, 2020

Country	N	n completely susceptible	%	n Multiresistant	%	n Resistant to both CIP and ERY	%
France	171	13	7.6	5	2.9	5	2.9
Germany	302	10	3.3	84	27.8	85	28.2
Spain	94	2	2.1	30	31.9	30	31.9
Total (3 MS)	**567**	**25**	**4.4**	**119**	**21.0**	**120**	**21.2**

N: total number of isolates; n: number of isolates
Complete susceptibility is defined as susceptibility to ciprofloxacin, nalidixic acid, erythromycin, gentamicin and tetracycline. MDR is defined as resistance to at least three antimicrobial substances (ciprofloxacin or nalidixic acid/ erythromycin/ gentamicin/ tetracycline).

Table 15: Number of countries with significantly increasing or decreasing trends in resistance to selected antimicrobials for *C. jejuni* and *C. coli* in broilers (2009-2020), for *C. jejuni* in fattening turkeys (2014-2020) and for *C. coli* in pigs (2009-2020)

Origin	*Campylobacter* species	Ciprofloxacin		Erythromycin		Tetracycline		Streptomycin	
		Incr.	Decr.	Incr.	Decr.	Incr.	Decr.	Incr.	Decr.
Broilers	*C. jejuni* (24 MS + 4 non-MS)	14 (AT, HR, CY, CZ, DK, FI, FR, DE, NL, RO, SE, SK, CH, UK)	1 (ES)		6 (BG, HU, NL, RO, SK, ES)	11 (AT, HR, CZ, DK, DE, IE, LT, SK, SE, CH, UK)	7 (BG, CY, FI, EL, IT, LV, ES)	15 (AT, BE, HR, CZ, DK, DE, HU, LV, LT, NL, PO, PT,SK, SI, UK)	6 (BG, FI, IE, IT, RO, SE)
	C. coli (8 MS, 1 non-MS)	3 (HR, DE, NL)	1 (FR)	1 (CZ)	3 (AT, FR, NL)	4 (CZ, DE, HR, CH)		1 (HR)	2 (ES, NL)
Turkeys	*C. jejuni* (8 MS, 1 non-MS)	2 (DE, PO)	2 (HU , IT)		3 (DE, PO, ES)	1 (HU)	4 (DE, ES, FR, UK)	5 (AT, DE, HU, PO, PT)	
Pigs	*C. coli* (7 MS + 2 non-MS)	3 (DE, NO, CH)			4 (HR, ES, NL, CH)	1 (CH)	1 (HR)	3 (HR, NO, CH)	2 (CZ, SE)

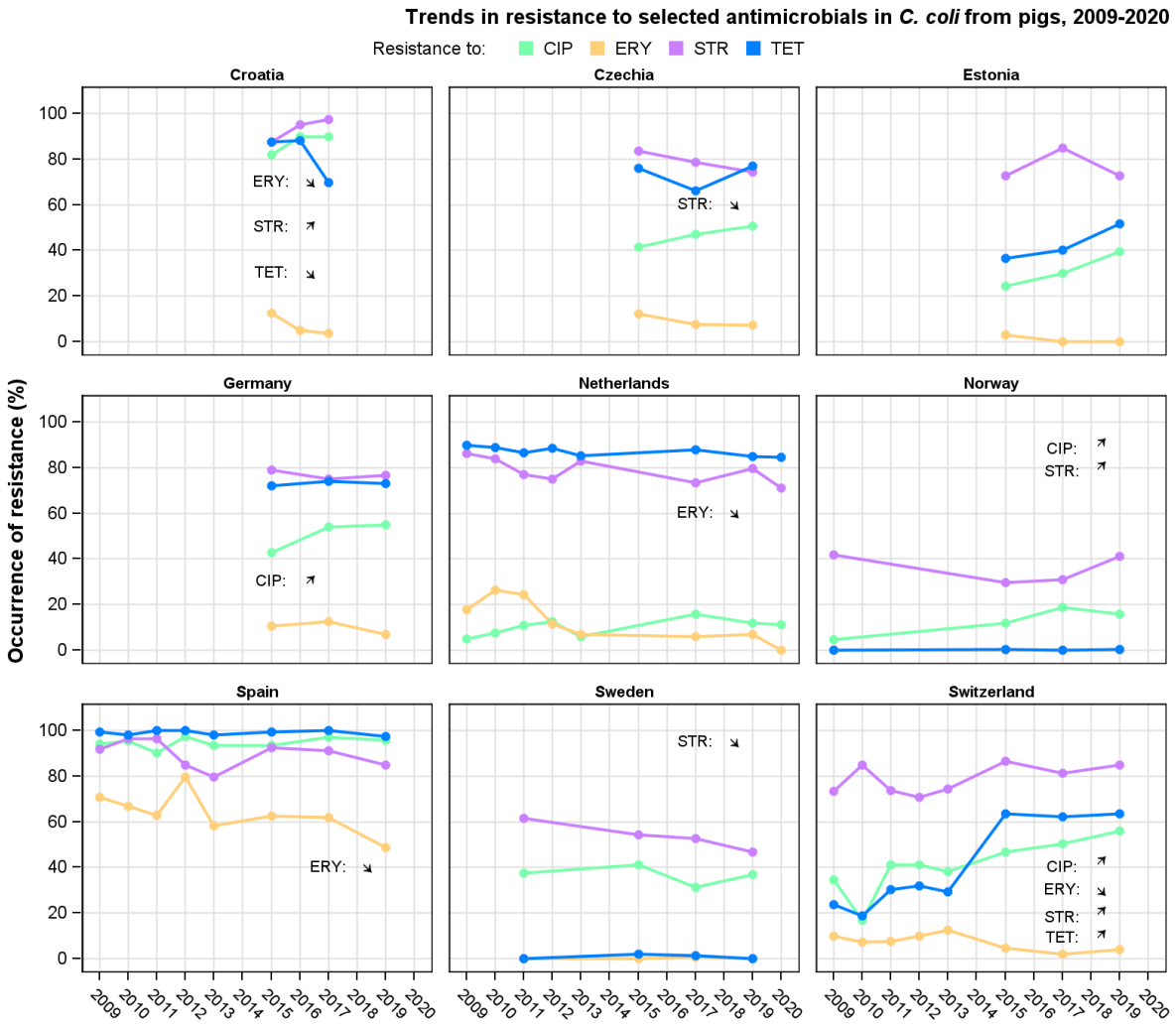


Figure 3: Trends in ciprofloxacin (CIP), erythromycin (ERY), streptomycin (STR), and tetracycline (TET) resistance in *C. coli* from pigs, reporting EU MSs, 2009–2020