Annex D - Data on presumptive ESBL-, AmpC- and/or carbapenemase-producing microorganisms and their resistance occurrence (routine and specific monitoring)

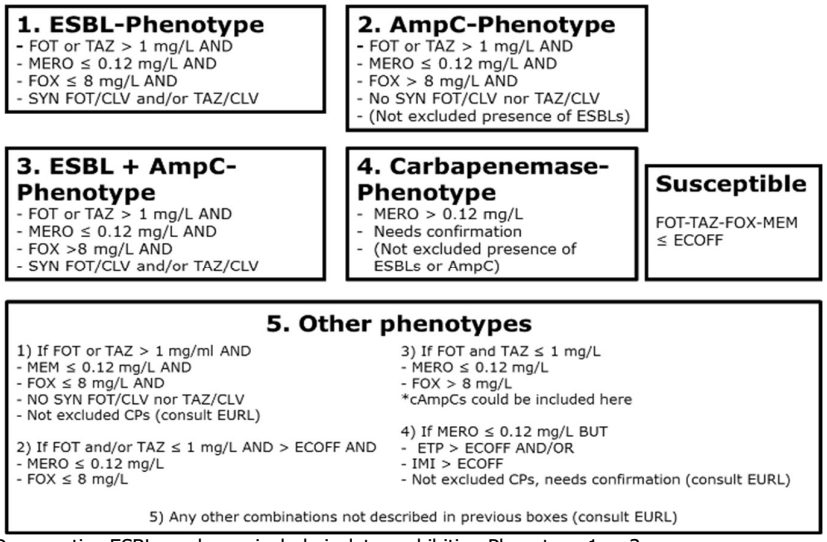
Annex to:

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

Annex D - Data on presumptive ESBL-, AmpC- and/or carbapenemase-producing microorganisms and their resistance occurrence (routine and specific monitoring)

According to Commission Implementing Decision *2013/652/EU*[1], MSs determined the susceptibility of *Salmonella* spp., and indicator commensal *E. coli* to selected antimicrobials belonging to different classes (Panel 1). All *Salmonella* spp. and indicator *E. coli* isolates, that after testing with Panel 1 were found to be resistant to cefotaxime, ceftazidime or meropenem, were further tested with a second panel of different beta-lactams that included among others, third generation cephalosporins and carbapenems (Panel 2) in order to phenotypically detect presumptive ESBL- AmpC- and/or carbapenemase producers. All isolates collected within the specific monitoring for ESBL/AMPC/carbapenemase-producing *E. coli* and/or carbapenemase-producing microorganisms, were tested for their susceptibility to both Panel 1 and Panel 2. More information is provided in Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209.

For this report, the categorisation of isolates resistant to third-generation cephalosporins and/or carbapenems in presumptive ESBL, AmpC or carbapenemase producers was carried out primarily based on the EUCAST guidelines for detection of resistance mechanisms and specific resistances of clinical and/or epidemiological importance (EUCAST, 2017) and consulted experts´ knowledge. In total, for the third generation cephalosporin- and/or carbapenem-resistant isolates, five main categorizations are made: 1. ESBL phenotype; 2. AmpC phenotype; 3. ESBL + AmpC phenotype; 4. CP-phenotype; and 5. Other phenotypes.



Presumptive ESBL-producers include isolates exhibiting Phenotype 1 or 3.
Presumptive AmpC-producers include isolates exhibiting Phenotype 2 or 3.

For the occurrence and prevalence tables, as well as the maps and graphics shown in the EUSR-AMR 2019/2020 Section 5 'ESBL/AmpC/CP producers monitoring', presumptive ESBL producers were considered as those exhibiting an ESBL and/or ESBL + AmpC phenotype, and presumptive AmpC producers, those with an AmpC and ESBL + AmpC phenotype.

More information is provided in Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209.

Figure 1: Phenotypes inferred based on the resistance to the β-lactams included in Panel 2.

[1] Commission Implementing Decision 2013/652/EU of 12 November 2013 on the monitoring and reporting of antimicrobial resistance in zoonotic and commensal bacteria. OJ L 303, 14.11.2013, p. 26–39.

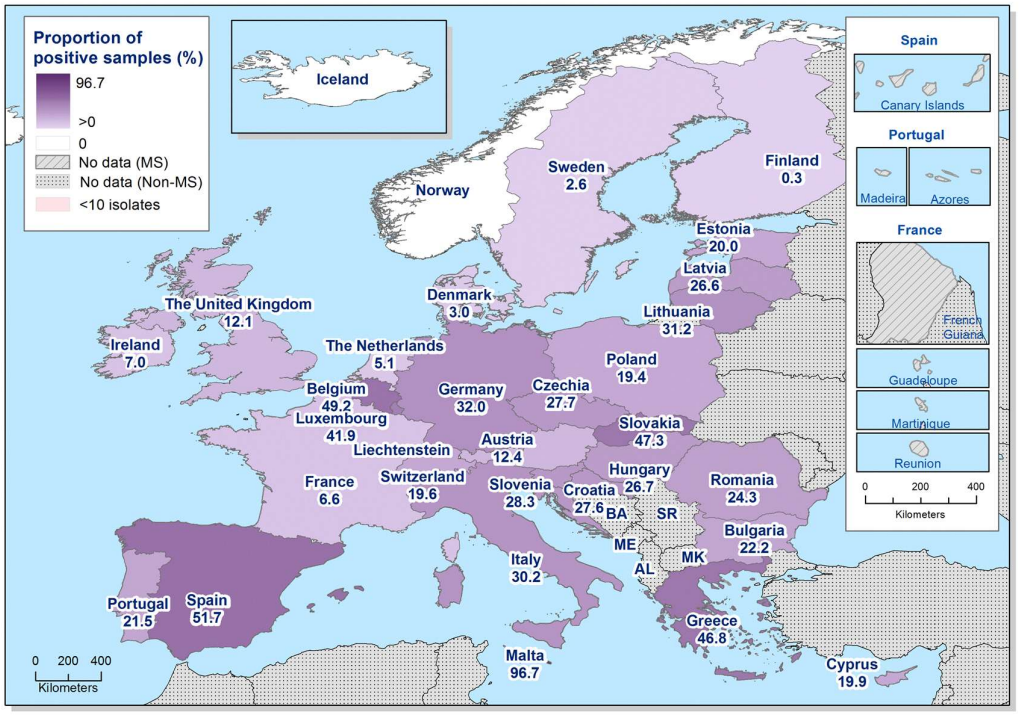
D.1. ESBL-, AmpC-producers prevalence maps

Marked variations among MSs in the prevalence of presumptive *E. coli* ESBL and/or AmpC-producers (*E. coli* showing an ESBL, AmpC or ESBL+AmpC phenotype) in samples from healthy animals and meat derived thereof are demonstrated by data presented in chapter 5 of this report. These variations withstand also when assessing the occurrence of isolates with ESBL or AmpC phenotypes separately in the different matrices (Figures 38, 40, and 42-45 as well as Tables 6, 8, 15, and 19).

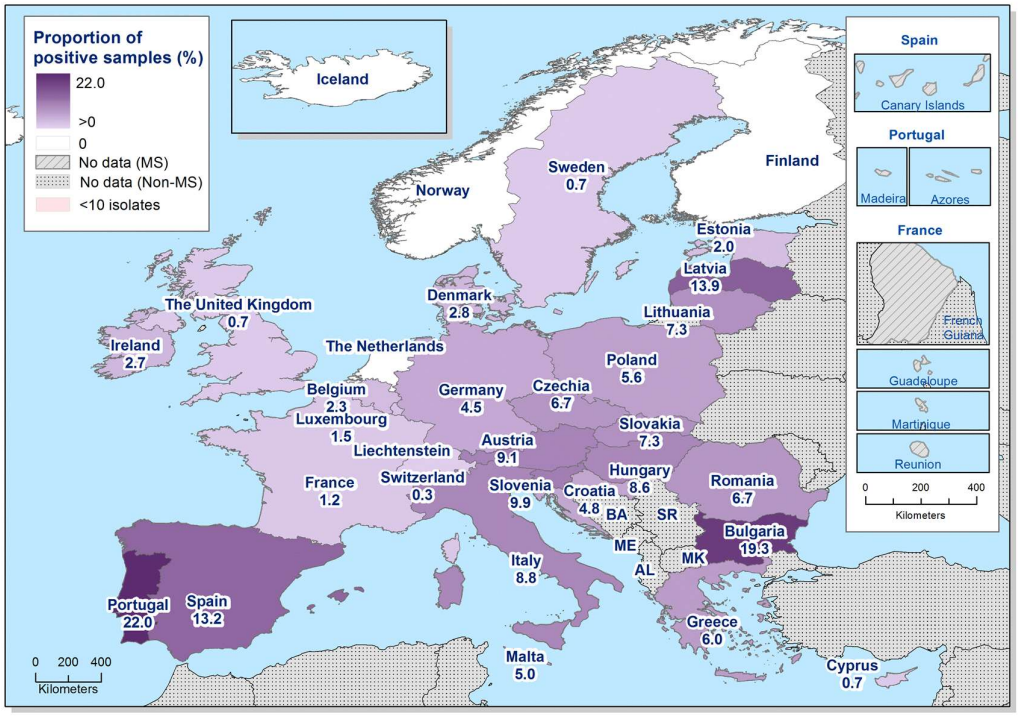
More precisely, the prevalence of presumptive *E. coli* ESBL-producers (*E. coli* showing an ESBL phenotype) ranges from 0.3% (Finland) to 71.4% (Spain) in fattening pigs; from 1.1% (Italy) to 69.2% (Germany) in calves under 1 year of age; from 0.3% (Finland) to 100% (Malta) in broilers; and from 0% (Sweden) to 68.6% (Spain) in fattening turkeys. Likewise, the prevalence of presumptive *E. coli* AmpC-producers (*E. coli* showing an AmpC phenotype) ranges from 0% (Cyprus) to 24.3% (Romania) in fattening pigs; from 0% (Italy) to 8.6% (France) in calves under 1 year of age; from 0% (Finland, Luxembourg, and Malta) to 26.6% (Lithuania) in broilers; and from 0% (Sweden) to 8.3% (Belgium and Portugal) in fattening turkeys.

Furthermore, the prevalence of presumptive *E. coli* ESBL-producers (*E. coli* showing an ESBL phenotype) ranges from 0% (Finland and the Netherlands) to 22.0% (Portugal) in meat from pigs; from 0% (France and Ireland) to 23.3% (Bulgaria) in meat from bovine animals; from 0.3% (Finland) to 96.7% (Malta) in meat from broilers. Likewise, the prevalence of presumptive *E. coli* AmpC-producers (*E. coli* showing an AmpC phenotype) ranges from 0% (Bulgaria, Finland, Greece, Luxembourg, the Netherlands and Sweden) to 6.0% (Slovenia) in meat from pigs; from 0% (Austria, Estonia, Finland, Latvia, Slovakia, Slovenia and United Kingdom) to 4.5% (Luxembourg) in meat from bovine animals; from 0% (Finland) to 25.1% (Lithuania) in meat from broilers.

a)



b)



c)

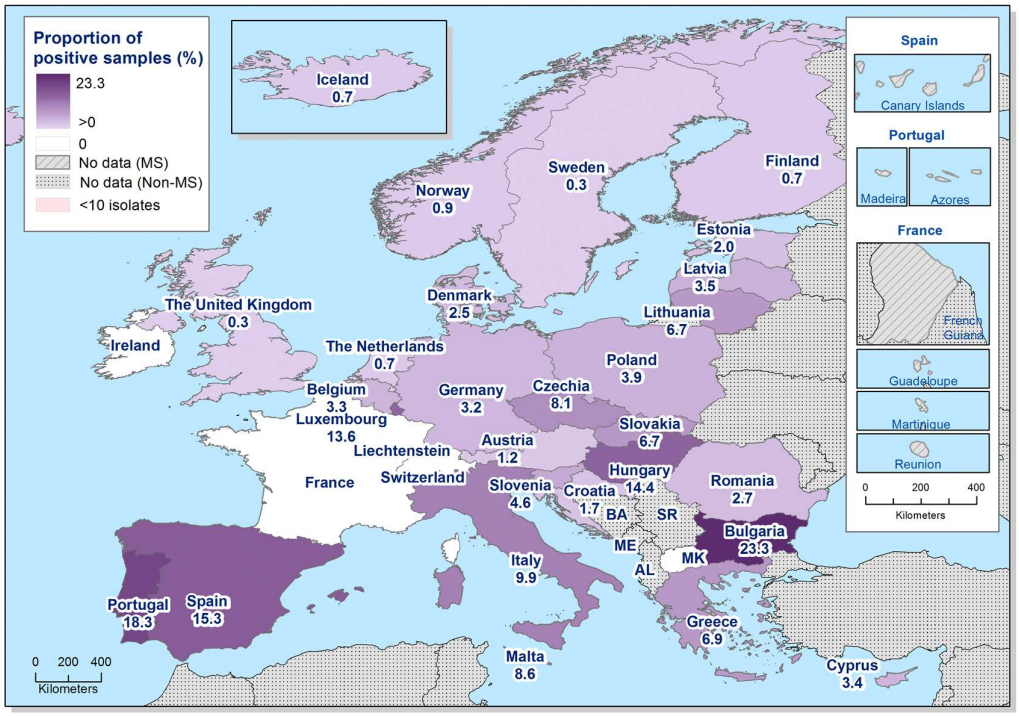
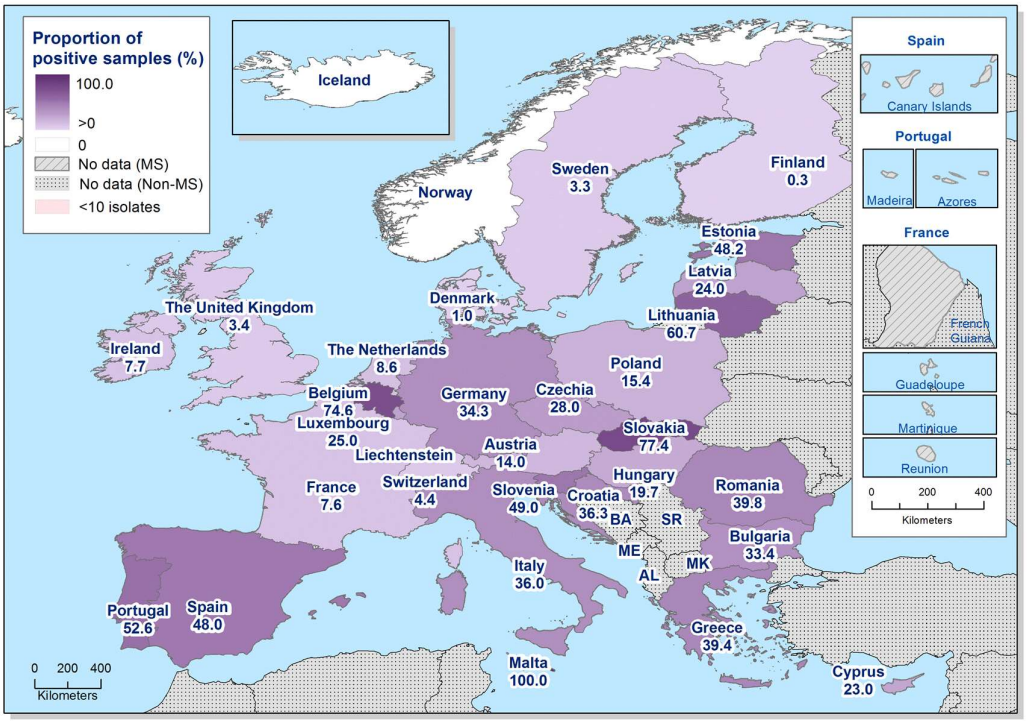
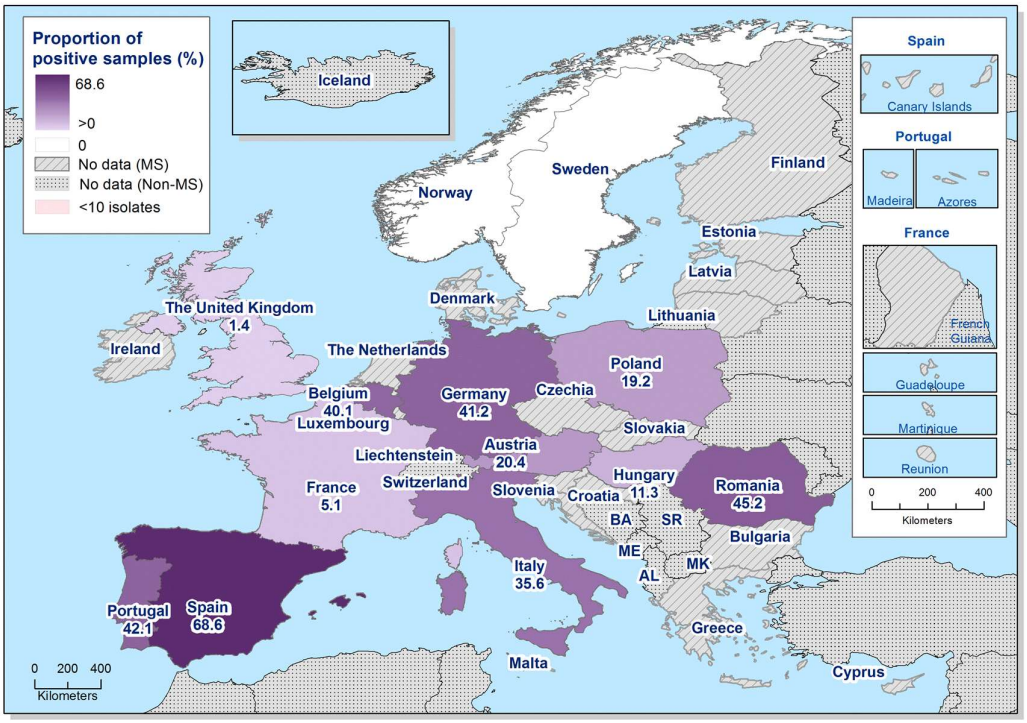


Figure 1: Spatial distribution of the prevalence of presumptive ESBL-producing *E. coli* from a) meat from broilers in 2020, b) meat from pigs in 2019 and c) bovine meat in 2019, EU MSs and non- MSs, 2019/2020.

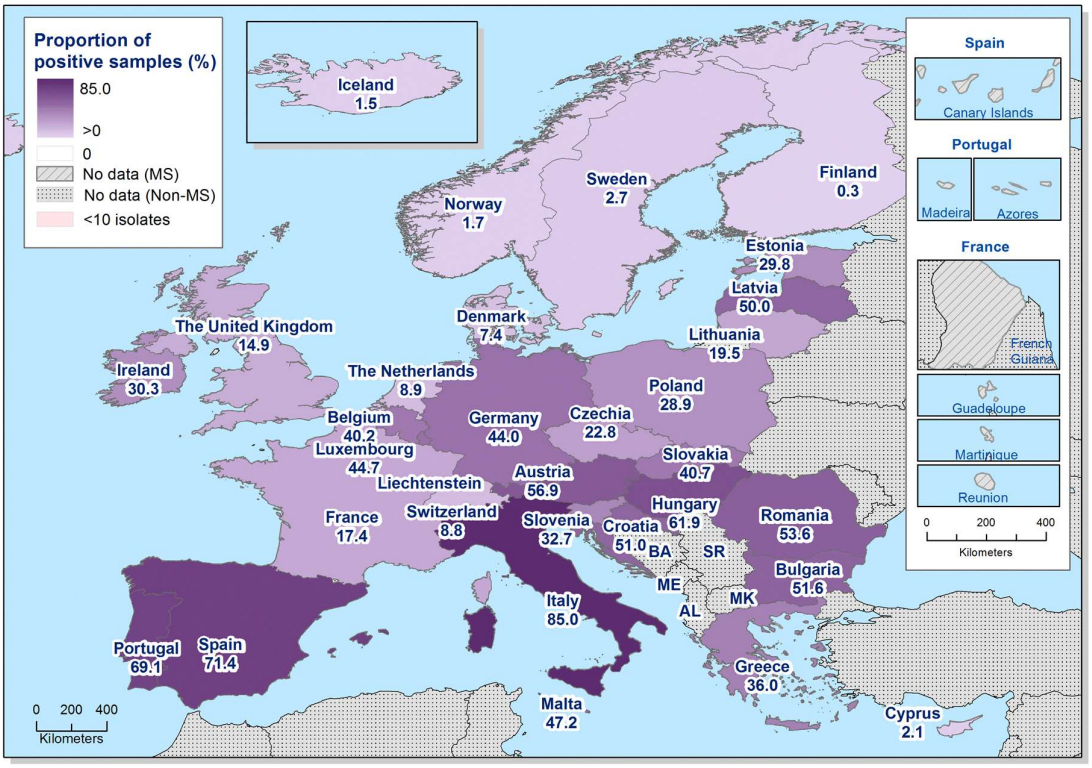
a)


Proportion of positive samples (%)
100.0
>0
0
No data (MS)
No data (Non-MS)
<10 isolates
Iceland
Spain
Canary Islands
Portugal
Madeira
Azores
France
French Guiana
Guadeloupe
Martinique
Reunion
0 200 400
Kilometers
Sweden 3.3
Finland 0.3
Norway
Estonia 48.2
Latvia 24.0
Lithuania 60.7
Denmark 1.0
The United Kingdom 3.4
Ireland 7.7
The Netherlands 8.6
Poland 15.4
Belgium 74.6
Germany 34.3
Czechia 28.0
Luxembourg 25.0
Slovakia 77.4
Liechtenstein
Austria 14.0
Hungary 19.7
France 7.6
Switzerland 4.4
Slovenia 49.0
Croatia 36.3
Romania 39.8
BA
SR
ME
Bulgaria 33.4
MK
AL
Italy 36.0
Portugal 52.6
Spain 48.0
Greece 39.4
Malta 100.0
Cyprus 23.0
0 200 400
Kilometers

b)


Proportion of positive samples (%)
68.6
>0
0
No data (MS)
No data (Non-MS)
<10 isolates
Iceland
Spain
Canary Islands
Portugal
Madeira
Azores
France
French Guiana
Guadeloupe
Martinique
Reunion
0 200 400
Kilometers
Sweden
Finland
Norway
Estonia
Latvia
Denmark
Lithuania
The United Kingdom 1.4
Ireland
The Netherlands
Poland 19.2
Belgium 40.1
Germany 41.2
Czechia
Luxembourg
Slovakia
Liechtenstein
Austria 20.4
Hungary 11.3
France 5.1
Switzerland
Slovenia
Croatia
Romania 45.2
BA
SR
ME
Bulgaria
MK
AL
Italy 35.6
Portugal 42.1
Spain 68.6
Greece
Malta
Cyprus
0 200 400
Kilometers

c)



d)

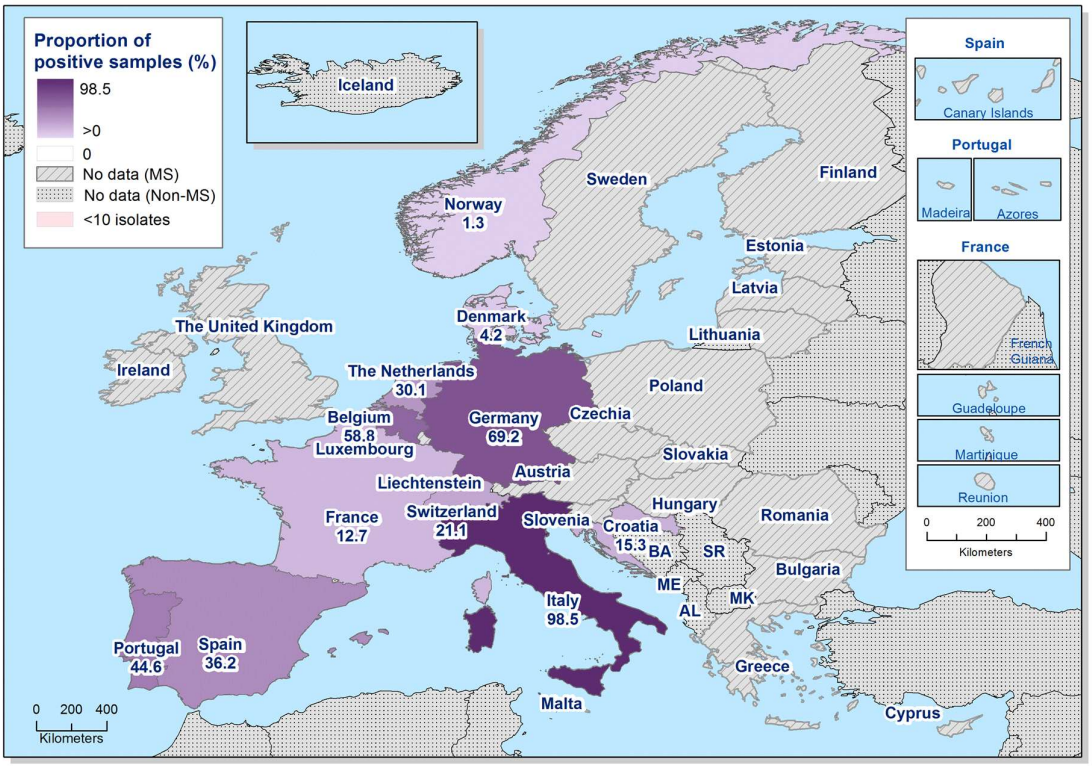
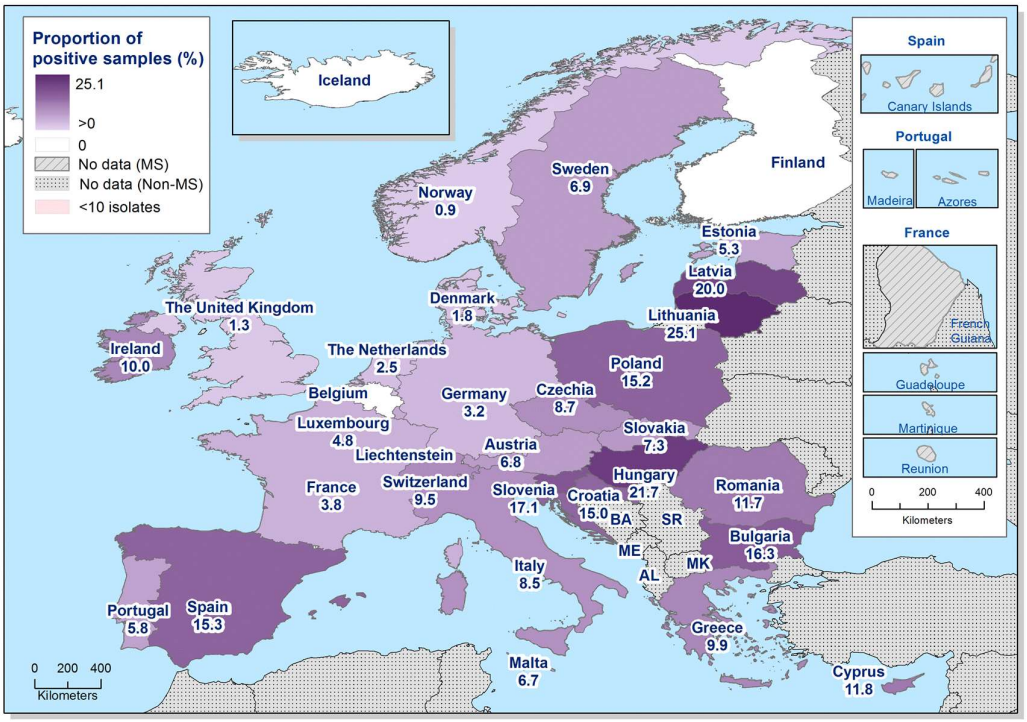
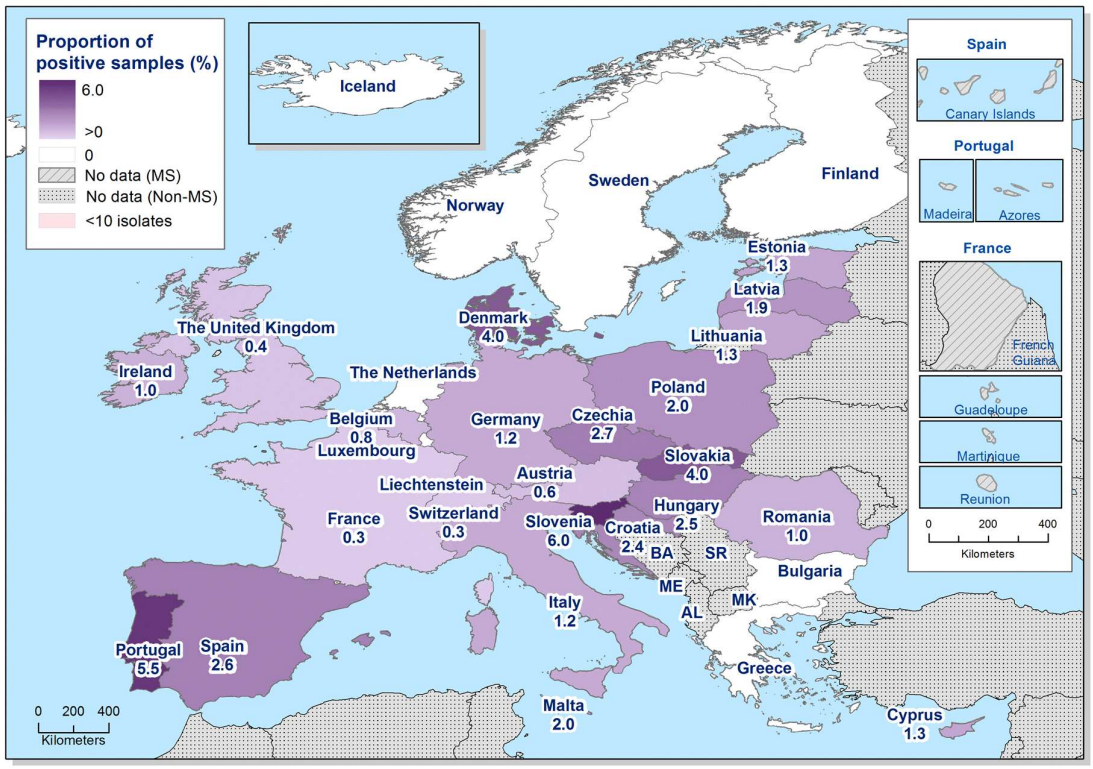


Figure 2: Spatial distribution of the prevalence of presumptive ESBL-producing *E. coli* from a) broilers in 2020, b) fattening turkeys in 2020, c) fattening pigs in 2019, and d) calves under 1 year of age in 2019, EU MSs and non- MSs, 2019/2020.

a)


Proportion of positive samples (%)
25.1
>0
0
No data (MS)
No data (Non-MS)
<10 isolates
Iceland
Spain
Canary Islands
Portugal
Madeira
Azores
France
French Guiana
Guadeloupe
Martinique
Reunion
0 200 400
Kilometers
Sweden 6.9
Finland
Norway 0.9
Estonia 5.3
Latvia 20.0
Lithuania 25.1
Denmark 1.8
The United Kingdom 1.3
Ireland 10.0
The Netherlands 2.5
Poland 15.2
Belgium
Germany 3.2
Czechia 8.7
Luxembourg 4.8
Slovakia 7.3
Liechtenstein
Austria 6.8
Hungary 21.7
France 3.8
Switzerland 9.5
Slovenia 17.1
Croatia 15.0
Romania 11.7
BA
SR
Bulgaria 16.3
ME
MK
AL
Italy 8.5
Portugal 5.8
Spain 15.3
Greece 9.9
Malta 6.7
Cyprus 11.8

b)


Proportion of positive samples (%)
6.0
>0
0
No data (MS)
No data (Non-MS)
<10 isolates
Iceland
Spain
Canary Islands
Portugal
Madeira
Azores
France
French Guiana
Guadeloupe
Martinique
Reunion
0 200 400
Kilometers
Sweden
Finland
Norway
Estonia 1.3
Latvia 1.9
Denmark 4.0
The United Kingdom 0.4
Lithuania 1.3
Ireland 1.0
The Netherlands
Poland 2.0
Belgium 0.8
Germany 1.2
Czechia 2.7
Luxembourg
Slovakia 4.0
Liechtenstein
Austria 0.6
Hungary 2.5
France 0.3
Switzerland 0.3
Slovenia 6.0
Croatia 2.4
Romania 1.0
BA
SR
Bulgaria
ME
MK
AL
Italy 1.2
Portugal 5.5
Spain 2.6
Greece
Malta 2.0
Cyprus 1.3

c)

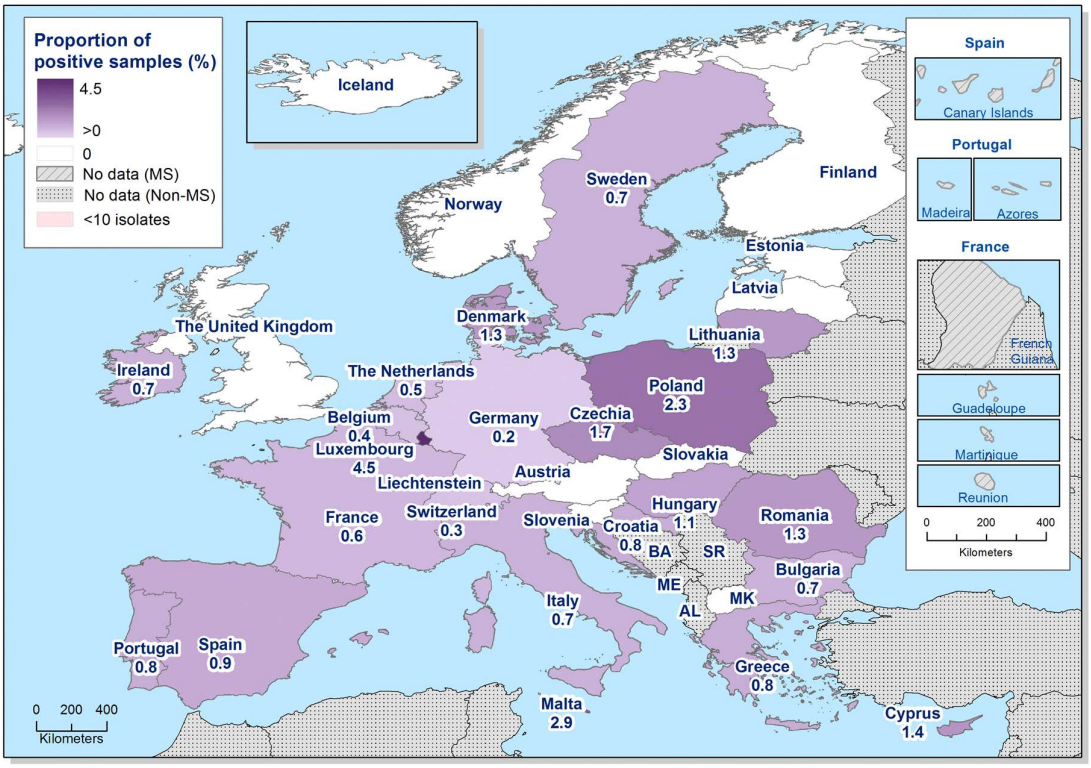
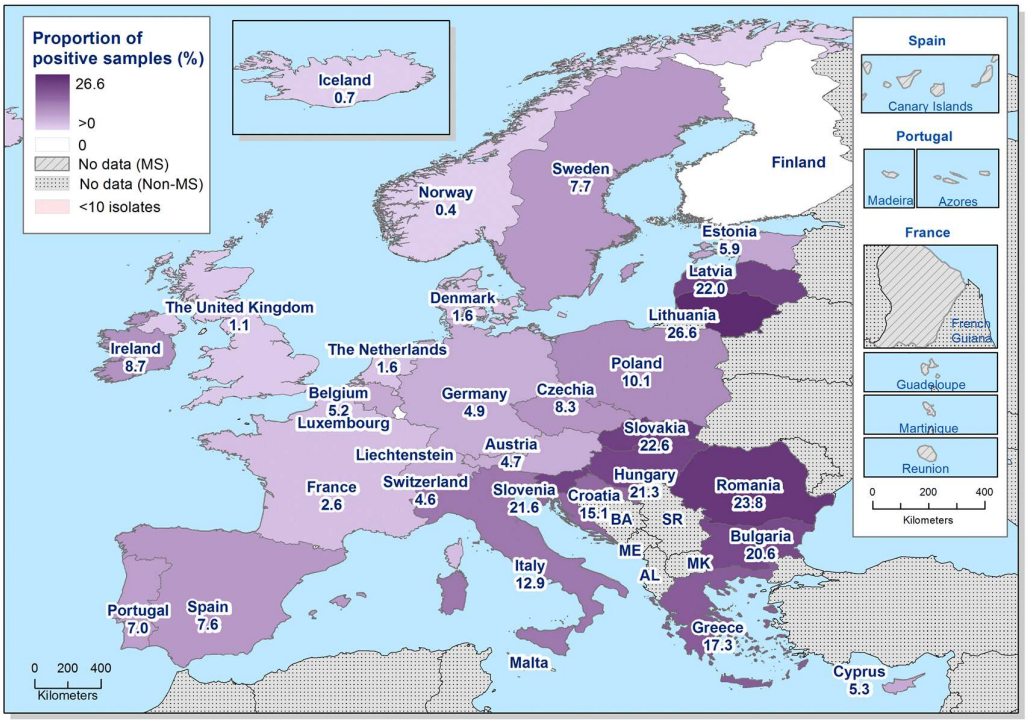
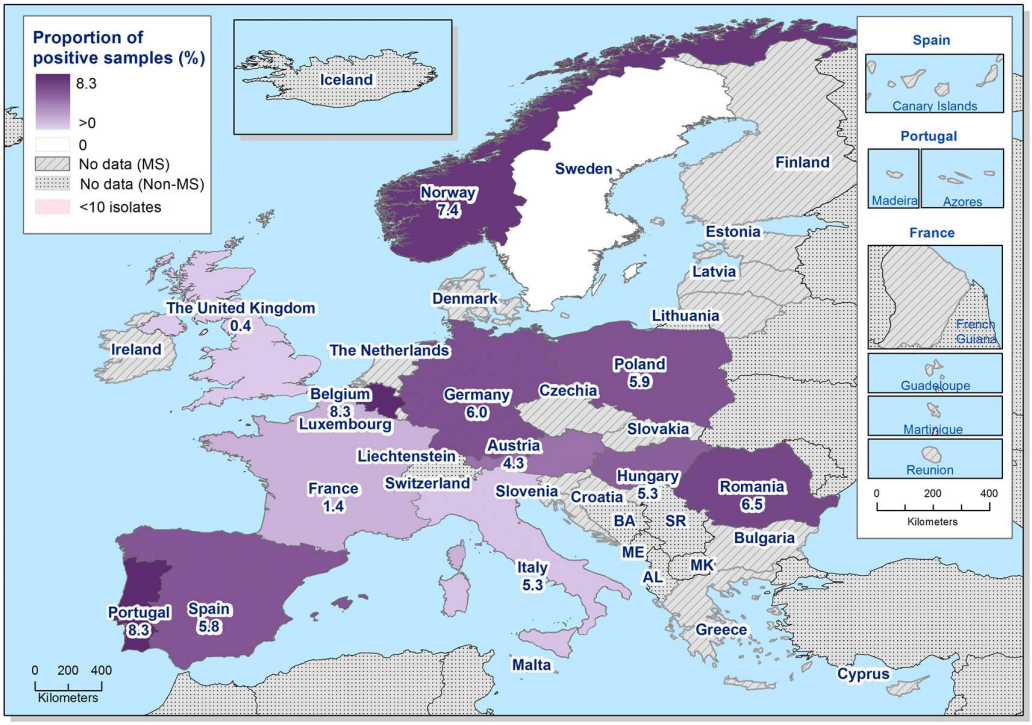


Figure 3: Spatial distribution of prevalence of presumptive AmpC-producing *E. coli* from a) meat from broilers in 2020, b) meat from pigs in 2019, and c) bovine meat in 2019, EU MSs and non-MSs, 2019/2020.

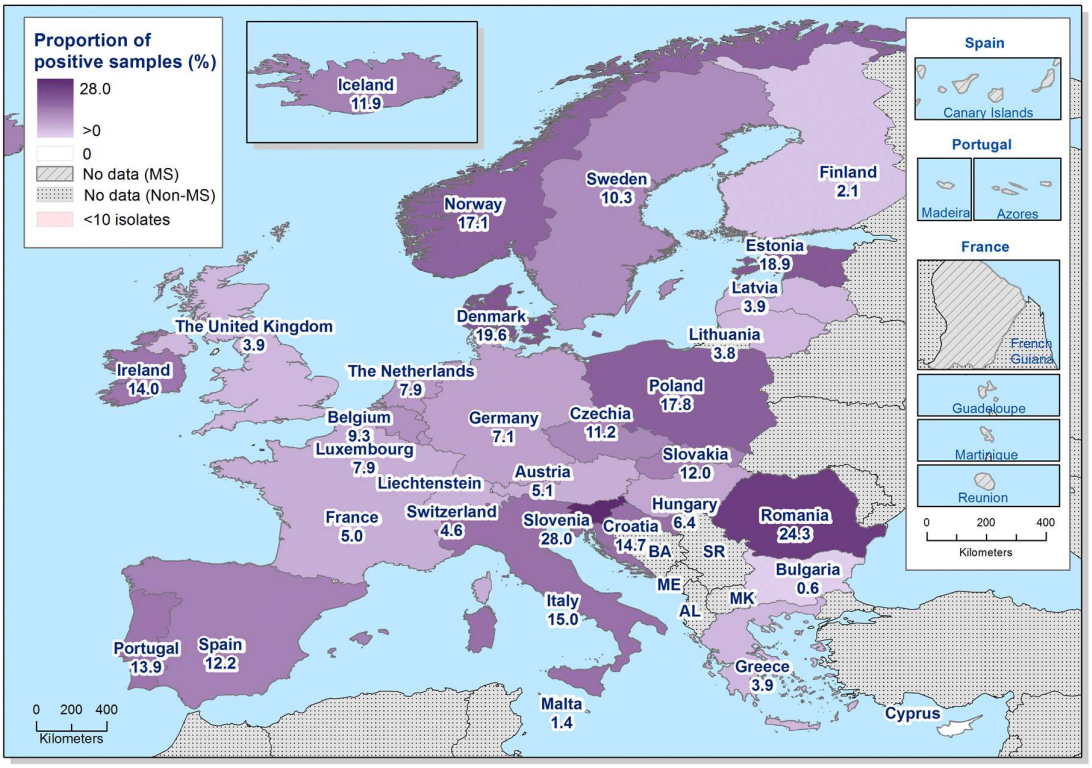
a)


Proportion of positive samples (%)
26.6
>0
0
No data (MS)
No data (Non-MS)
<10 isolates
Iceland 0.7
Norway 0.4
Sweden 7.7
Finland
Estonia 5.9
Latvia 22.0
Lithuania 26.6
Denmark 1.6
The United Kingdom 1.1
Ireland 8.7
The Netherlands 1.6
Belgium 5.2
Luxembourg
Germany 4.9
Czechia 8.3
Poland 10.1
Slovakia 22.6
Austria 4.7
Liechtenstein
France 2.6
Switzerland 4.6
Slovenia 21.6
Croatia 15.1
Hungary 21.3
Romania 23.8
BA
SR
ME
Bulgaria 20.6
MK
AL
Italy 12.9
Portugal 7.0
Spain 7.6
Greece 17.3
Malta
Cyprus 5.3
0 200 400
Kilometers
Spain
Canary Islands
Portugal
Madeira
Azores
France
French Guiana
Guadeloupe
Martinique
Reunion
0 200 400
Kilometers

b)


Proportion of positive samples (%)
8.3
>0
0
No data (MS)
No data (Non-MS)
<10 isolates
Iceland
Norway 7.4
Sweden
Finland
Estonia
Latvia
Lithuania
Denmark
The United Kingdom 0.4
Ireland
The Netherlands
Belgium 8.3
Luxembourg
Germany 6.0
Czechia
Poland 5.9
Slovakia
Austria 4.3
Liechtenstein
France 1.4
Switzerland
Slovenia
Croatia
Hungary 5.3
Romania 6.5
BA
SR
ME
Bulgaria
MK
AL
Italy 5.3
Portugal 8.3
Spain 5.8
Greece
Malta
Cyprus
0 200 400
Kilometers
Spain
Canary Islands
Portugal
Madeira
Azores
France
French Guiana
Guadeloupe
Martinique
Reunion
0 200 400
Kilometers

c)



d)

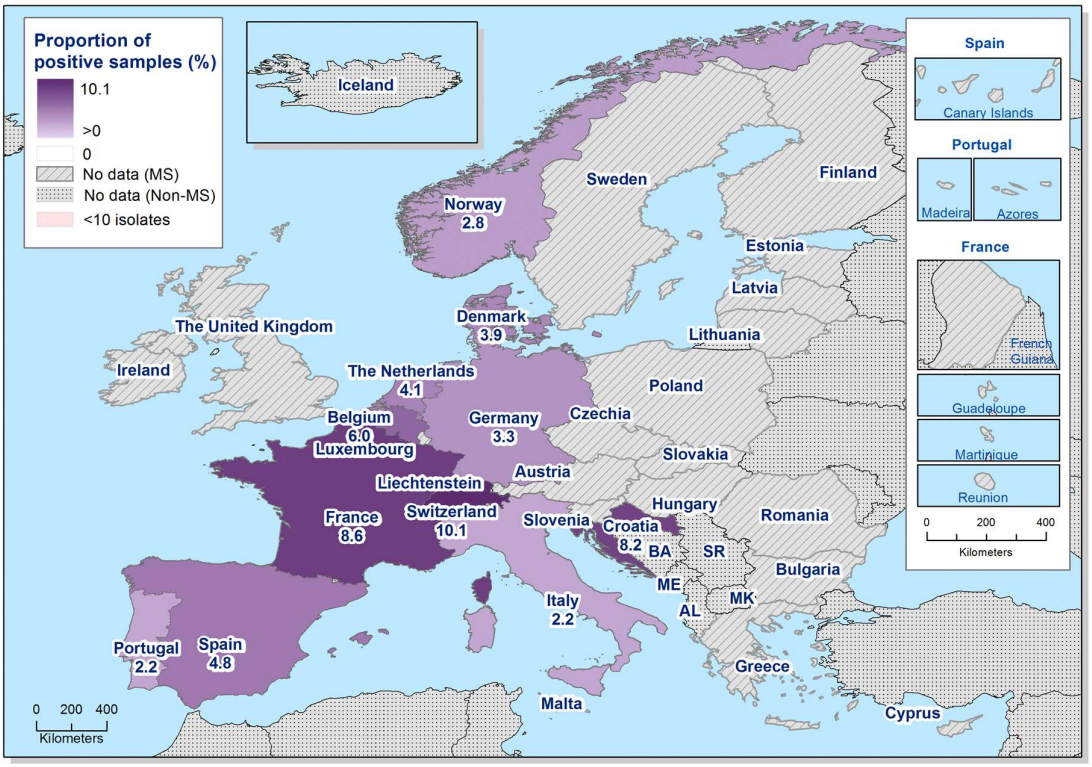


Figure 4: Spatial distribution of prevalence of presumptive AmpC-producing *E. coli* from a) broilers in 2020, b) fattening turkeys in 2020, c) fattening pigs in 2019, and d) calves under 1 year of age in 2019, EU MSs and non- MSs, 2019/2020.

D.2. ESBL-, AmpC-, carbapenemase-producers prevalence and occurrence tables – poultry 2020

Table 1: Presumptive ESBL- and AmpC-producing *Salmonella* spp. isolates from meat from broilers (carcases), broilers, meat from turkeys (carcases), fattening turkeys and laying hens collected within the routine monitoring and subjected to supplementary testing (panel 2) in 2020

Country	N_{P1}	N_{P2} [(a)]	ESBL and/or AmpC		ESBL[(b)]		ESBL only CLA/CTX SYN[(c)]		ESBL only CLA/CAZ SYN[(d)]		AmpC[(e)]		AmpC + ESBL[(f)]		CPs[(g)]	
			n	%[(h)]	n	%[(h)]	n	%[(h)]	n	%[(h)]	n	%[(h)]	n	%[(h)]	n	%[(h)]
Meat from broilers																
Belgium	128	1	1	0.8	1	0.8	0	0	0	0	0	0	0	0	0	0
France	106	1	1	0.9	0	0	0	0	0	0	1	0.9	0	0	0	0
Italy[(i)]	14	1	1	7.1	1	7.1	0	0	0	0	0	0	0	0	0	0
Total (3 MSs)	**248**	**3**	**3**	**1.2**	**2**	**0.8**	**0**	**0**	**0**	**0**	**1**	**0.4**	**0**	**0**	**0**	**0**
Iceland	10	1	1	10.0	1	10.0	0	0	0	0	0	0	0	0	0	0
Broilers																
Austria	170	2	2	1.2	2	1.2	0	0	0	0	0	0	0	0	0	0
France	168	1	1	0.6	0	0	0	0	0	0	1	0.6	0	0	0	0
Hungary	170	3	3	1.8	0	0	0	0	0	0	3	1.8	0	0	0	0
Italy[(i)]	214	29	29	13.6	29	13.6	4	1.9	0	0	1	0.5	1	0.5	0	0
Malta	52	7	7	13.5	7	13.5	0	0	0	0	0	0	0	0	0	0
Slovenia	164	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total (6 MSs)	**938**	**43**	**42**	**4.5**	**38**	**4.1**	**4**	**0.4**	**0**	**0.0**	**5**	**0.5**	**1**	**0.1**	**0**	**0.0**
Fattening turkeys																
Italy[(i)]	170	2	2	1.2	2	1.2	0	0	0	0	0	0	0	0	0	0
Poland	22	1	1	4.5	1	4.5	0	0	0	0	0	0	0	0	0	0
Total (2 MSs)	**192**	**3**	**3**	**1.6**	**3**	**1.6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Laying hens																
Hungary	30	2	2	6.7	0	0	0	0	0	0	2	6.7	0	0	0	0
Italy	172	2	2	1.2	2	1.2	0	0	0	0	0	0	0	0	0	0
Total (2 MSs)	**202**	**4**	**4**	**2**	**2**	**1**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**0**

ESBL: extended-spectrum β-lactamase; n: isolates with this phenotype; %: percentage of isolates with this phenotype from the total tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate. MSs: Member States. N_{P1} and N_{P2}: total number of isolates tested in Panel 1 and 2, respectively.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were considered for further classification (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209). Thus, some of the isolates tested in Panel 2 do not show presumptive resistance phenotypes compatible with those defined for the present report.

(b): All isolates showing clavulanate synergy with cefotaxime, ceftazidime or with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).

(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.

(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with activity.

(e): Isolates with microbiological resistance to cefoxitin, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).
(f): Isolates showing synergy with cefotaxime or ceftazidime and with microbiological resistance to cefoxitin, suggesting the presence of ESBL and AmpC enzymes in the same isolate. These isolates are also included in the ESBL and AmpC columns.
(g): Isolates with microbiological meropenem resistance.
(h): Percentage of the total number of *Salmonella* spp. isolates tested (with panel 1).
(i): Molecular data were provided by Italy; meat from broilers: 1 CTX-M, broilers: 27 CTX-M, and fattening turkey: 2 CTX-M.

Table 2: Presumptive ESBL and AmpC-producing indicator *E. coli* isolates from broiler flocks collected within the routine monitoring and subjected to supplementary testing (panel 2) in 2020

Country	N_{P1}	N_{P2}[a]	ESBL and/or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		AmpC + ESBL[f]		CPs[g]	
			N	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Belgium	165	11	11	6.7	11	6.7	0	0	3	1.8	2	1.2	2	1.2	0	0
Bulgaria	100	1	1	1.0	1	1.0	1	1.0	0	0	0	0	0	0	0	0
Cyprus	99	7	7	7.1	6	6.1	1	1.0	0	0	2	2.0	1	1.0	0	0
France	222	2	1	0.5	1	0.5	0	0	1	0.5	0	0	0	0	0	0
Germany	214	5	5	2.3	5	2.3	0	0	3	1.4	0	0	0	0	0	0
Greece	170	1	1	0.6	1	0.6	1	0.6	0	0	0	0	0	0	0	0
Hungary	170	2	2	1.2	0	0	0	0	0	0	2	1.2	0	0	0	0
Italy[i]	170	2	2	1.2	2	1.2	0	0	1	0.6	0	0	0	0	0	0
Latvia	150	1	1	0.7	0	0	0	0	0	0	1	0.7	0	0	0	0
Lithuania	100	5	4	4.0	1	1.0	0	0	0	0	3	3.0	0	0	0	0
Malta	3	1	1	33,3	1	33,3	0	0	0	0	0	0	0	0	0	0
Netherlands	305	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poland	175	4	3	1.7	3	1.7	2	1.1	0	0	1	0.6	1	0.6	0	0
Portugal	156	5	5	3.2	5	3.2	1	0.6	0	0	2	1.3	2	1.3	0	0
Romania	168	6	6	3.6	4	2.4	2	1.2	0	0	2	1.2	0	0	0	0
Slovenia	85	1	1	1.2	1	1.2	0	0	0	0	0	0	0	0	0	0
Spain	170	3	2	1.2	2	1.2	0	0	0	0	1	0.6	1	0.6	0	0
Total (17 MSs)	**2,622**	**58**	**53**	**2.0**	**44**	**1.7**	**8**	**0.3**	**8**	**0.3**	**16**	**0.6**	**7**	**0.3**	**0**	**0**
United Kingdom	250	1	1	0.4	1	0.4	0	0	0	0	0	0	0	0	0	0

ESBL: extended-spectrum β-lactamase; n: isolates with this phenotype; %: percentage of isolates from the total tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; N_{P1}: Total number of isolates tested by panel 1; N_{P2}: Total number of isolates tested by panel 2.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were considered for further classification (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209). Thus, some of the isolates tested in Panel 2 do not show presumptive resistance phenotypes compatible with those defined for the present report.

(b): All isolates showing clavulanate synergy with cefotaxime, ceftazidime or with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).

(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.

(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.

(e): Isolates with microbiological resistance to cefoxitin, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).

(f): Isolates showing synergy with cefotaxime or ceftazidime and with microbiological resistance to cefoxitin, suggesting the presence of ESBL and AmpC enzymes in the same isolate. These isolates are also included in the ESBL and AmpC columns.

(g): Isolates with microbiological meropenem resistance.

(h): Percentage of the total number of *E. coli* isolates tested (with panel 1).

(i): Molecular data were provided by:
Italy (1 CTX-M, and 1 SHV); Latvia (1 ESBL-phenotype/genotype).

Table 3: Presumptive ESBL and AmpC-producing indicator *E. coli* isolates from fattening turkeys collected within the routine monitoring and subjected to supplementary testing (Panel 2) in 2020

Country	N_{P1}	N_{P2}[a]	ESBL and/or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		AmpC + ESBL[f]		CPs[g]	
			n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Belgium	94	6	6	6.4	5	5.3	0	0	1	1.1	3	3.2	2	2.1	0	0
France	171	1	1	0.6	1	0.6	0	0	0	0	0	0	0	0	0	0
Germany	213	3	2	0.9	1	0.5	0	0	0	0	1	0.5	0	0	0	0
Italy[i]	170	3	3	1.8	3	1.8	1	0.6	0	0	0	0	0	0	0	0
Poland	182	4	3	1.6	3	1.6	1	0.5	1	0.5	0	0	0	0	0	0
Portugal	142	5	5	3.5	4	2.8	1	0.7	0	0	2	1.4	1	0.7	0	0
Spain	170	6	6	3.5	6	3.5	0	0	0	0	0	0	0	0	0	0
Total (8 MSs)	**1,142**	**28**	**26**	**2.3**	**23**	**2.0**	**3**	**0.3**	**2**	**0.2**	**6**	**0.5**	**3**	**0.3**	**0**	**0**
Norway	120	2	2	1.7	0	0	0	0	0	0	2	1.7	0	0	0	0
United Kingdom	197	2	2	1.0	2	1.0	0	0	0	0	0	0	0	0	0	0

ESBL: extended-spectrum β-lactamase; n: isolates with this phenotype; %: percentage of isolates from the total tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were considered for further classification (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209). Thus, some of the isolates tested in Panel 2 do not show presumptive resistance phenotypes compatible with those defined for the present report.

(b): All isolates showing clavulanate synergy with cefotaxime, ceftazidime or with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).

(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.

(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.

(e): Isolates with microbiological resistance to cefoxitin, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).

(f): Isolates showing synergy with cefotaxime or ceftazidime and with microbiological resistance to cefoxitin, suggesting the presence of ESBL and AmpC enzymes in the same isolate. These isolates are also included in the ESBL and AmpC columns.

(g): Isolates with microbiological meropenem resistance.

(h): Percentage of the total number of *E. coli* isolates tested (with panel 1).

(i): Molecular data were provided by Italy (3 CTX-M).

Table 4: Prevalence of presumptive ESBL- and AmpC-producing *E. coli* isolates from broiler meat collected within the specific ESBLs-/AmpC-/carbapenemase-producing monitoring and subjected to supplementary testing (panel 2) in 2020

Country	N_s	ESBL and/or AmpC[a]		ESBL[b]		ESBL only CTX/CLA SYN[c]		ESBL only CAZ/CLA SYN[d]		AmpC[e]		AmpC + ESBL[f]		CPs[g]	
		%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI
Austria	307	18.9	14.7-23.7	12.4	8.9-16.6	3.6	1.8-6.3	0.6	0.1-2.3	6.8	4.3-10.3	0.3	0-1.8	0	0-1.2
Belgium	250	49.2	42.8-55.6	49.2	42.8-55.6	49.2	42.8-55.6	0	0-1.5	0	0-1.5	0	0-1.5	0	0-1.5
Bulgaria	153	37.9	30.2-46.1	22.2	15.9-29.6	6.5	3.2-11.7	0	0-2.4	16.3	10.9-23.2	0.6	0-3.6	0	0-2.4
Croatia	127	42.5	33.8-51.6	27.6	20-36.2	15.7	9.9-23.3	0	0-2.9	15	9.3-22.4	0	0-2.9	0	0-2.9
Cyprus	136	27.2	19.9-35.5	19.9	13.5-27.6	4.4	1.6-9.4	0	0-2.7	11.8	6.9-18.4	4.4	1.6-9.4	0	0-2.7
Czechia	299	36.5	31-42.2	27.7	22.8-33.2	13.7	10-18.1	0	0-1.2	8.7	5.8-12.5	0	0-1.2	0	0-1.2
Denmark	336	4.8	2.7-7.6	3	1.4-5.4	0	0-1.1	0	0-1.1	1.8	0.7-3.8	0	0-1.1	0	0-1.1
Estonia	75	24	14.9-35.3	20	11.6-30.8	4	0.8-11.2	1.3	0-7.2	5.3	1.5-13.1	1.3	0-7.2	0	0-4.8
Finland	296	0.3	0-1.9	0.3	0-1.9	0	0-1.2	0	0-1.2	0	0-1.2	0	0-1.2	0	0-1.2
France	316	10.1	7-14	6.6	4.2-10	1.6	0.5-3.7	0	0-1.2	3.8	2-6.5	0.3	0-1.8	0	0-1.2
Germany	449	33.2	28.4-37.3	32	27.3-36.1	2.5	1.2-4.3	0.4	0.1-1.6	3.2	1.7-5.2	2	0.9-3.8	0	0-0.8
Greece	222	55	48.2-61.6	46.8	40.1-53.6	14.8	10.5-20.2	0	0-1.6	9.9	6.3-14.6	1.8	0.5-4.5	0	0-1.6
Hungary	300	47.4	41.6-53.2	26.7	21.7-32.1	7.7	4.9-11.3	0.3	0-1.8	21.7	17.1-26.8	1	0.2-2.9	0	0-1.2
Ireland	300	17	12.9-21.7	7	4.4-10.5	1.3	0.4-3.4	1.3	0.4-3.4	10	6.8-14	0	0-1.2	0	0-1.2
Italy	281	38.4	32.7-44.4	30.2	24.9-36	9.6	6.4-13.7	0.7	0.1-2.5	8.5	5.5-12.4	0.3	0-2	0	0-1.3
Latvia	150	46.7	38.5-55	26.6	19.8-34.5	3.3	1.1-7.6	0	0-2.4	20	13.9-27.3	0	0-2.4	0	0-2.4
Lithuania	151	55.6	47.3-63.7	31.2	23.8-39.2	11.2	6.7-17.4	0.7	0-3.6	25.1	18.5-32.9	0.7	0-3.6	0	0-2.4
Luxembourg	138	43.5	30.9-47.8	41.9	29.6-46.3	5.7	2.1-10.2	4	1.2-8.3	4.8	1.6-9.2	3.2	0.8-7.3	0	0-2.6
Malta	60	100	94-100	96.7	88.5-99.6	5	1-13.9	0	0-6	6.7	1.8-16.2	3.3	0.4-11.5	0	0-6
Netherlands	252	6.3	3.4-9.6	5.1	2.5-8.2	0.4	0-2.2	0	0-1.5	2.5	0.9-5.1	1.3	0.2-3.4	0	0-1.5
Poland	315	33	27.8-38.5	19.4	15.1-24.2	4.8	2.7-7.7	0.3	0-1.8	15.2	11.5-19.7	1.6	0.5-3.7	0	0-1.2
Portugal	121	25.6	18.1-34.4	21.5	14.5-29.9	4.1	1.4-9.4	0	0-3	5.8	2.4-11.6	1.7	0.2-5.8	0	0-3
Romania	300	35.3	29.9-41	24.3	19.6-29.6	3.7	1.8-6.5	0	0-1.2	11.7	8.3-15.9	0.7	0.1-2.4	0	0-1.2
Slovakia	150	54	45.7-62.2	47.3	39.1-55.6	25.3	18.6-33.1	1.3	0.2-4.7	7.3	3.7-12.7	0.7	0-3.7	0	0-2.4
Slovenia	152	44.7	36.7-53	28.3	21.3-36.2	11.2	6.7-17.3	2	0.4-5.7	17.1	11.5-24	0	0-2.4	0	0-2.4
Spain	300	60.7	54.9-66.2	51.7	45.9-57.4	13	9.4-17.3	0.3	0-1.8	15.3	11.4-19.9	6.3	3.9-9.7	0	0-1.2
Sweden	306	9.5	6.4-13.3	2.6	1.1-5.1	1	0.2-2.8	0	0-1.2	6.9	4.3-10.3	0	0-1.2	0	0-1.2
EU Total (28 MSs)	**6,242**	**31.5**	30.2-32.6	23.6	22.4-24.5	7.7	7-8.3	0.4	0.3-0.6	9	8.3-9.7	1	0.8-1.3	0	0-0.1
Iceland	140	0	0-2.6	0	0-2.6	0	0-2.6	0	0-2.6	0	0-2.6	0	0-2.6	0	0-2.6
Norway	321	0.9	0.2-2.7	0	0-1.1	0	0-1.1	0	0-1.1	0.9	0.2-2.7	0	0-1.1	0	0-1.1
Switzerland	296	29.1	23.9-34.6	19.6	15.2-24.6	6.4	3.9-9.8	1	0.2-2.9	9.5	6.4-13.4	0	0-1.2	0	0-1.2
United Kingdom	315	12.7	9.2-16.9	12.1	8.7-16.2	2.5	1.1-4.9	0.3	0-1.8	1.3	0.3-3.2	0.6	0.1-2.3	0	0-1.2

ESBL: extended-spectrum β-lactamase; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; N_s: total number of samples tested.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were considered for further classification (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209). Thus, some of the isolates tested in Panel 2 do not show presumptive resistance phenotypes compatible with those defined for the present report.
(b): All isolates showing clavulanate synergy with CTX or CAZ or synergy with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).
(c): Isolates showing synergy with CTX only, suggesting the presence of an ESBL with cefotaximase activity.
(d): Isolates showing synergy with CAZ only, suggesting the presence of an ESBL with ceftazidimase activity.
(e): Isolates with microbiological resistance to FOX, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).
(f): Isolates showing synergy with CTX or CAZ and microbiological resistance to FOX, suggesting ESBL and AmpC enzymes in the same isolate. ESBL and AmpC columns include those isolates.
(g): Isolates with microbiological meropenem resistance.

Table 5: Occurrence of presumptive ESBL- and AmpC-producing *E. coli* isolates from broiler meat collected within the specific ESBLs-/AmpC-/carbapenemase-producing monitoring and subjected to supplementary testing (panel 2) in 2020

Country	N_{P2}	ESBL and/or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		AmpC + ESBL[f]		CPs[g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Austria	58	58	100	38	65.5	11	19	2	3.4	21	36.2	1	1.7	0	0
Belgium	123	118	95.9	115	93.5	6	4.9	10	8.1	16	13.0	13	10.6	0	0
Bulgaria	58	58	100	34	58.6	10	17.2	0	0	25	43.1	1	1.7	0	0
Croatia	54	54	100	35	64.8	20	37	0	0	19	35.2	0	0	0	0
Cyprus	37	37	100	27	73	6	16.2	0	0	16	43.2	6	16.2	0	0
Czechia	109	109	100	83	76.1	41	37.6	0	0	26	23.9	0	0	0	0
Denmark[i]	16	16	100	10	62.5	0	0	0	0	6	37.5	0	0	0	0
Estonia	18	18	100	15	83.3	3	16.7	1	5.6	4	22.2	1	5.6	0	0
Finland	1	1	100	1	100	0	0	0	0	0	0	0	0	0	0
France	35	32	91.4	21	60	5	14.3	0	0	12	34.3	1	2.9	0	0
Germany	149	147	98.7	142	95.3	11	7.4	2	1.3	14	9.4	9	6	0	0
Greece	122	122	100	104	85.2	33	27	0	0	22	18	4	3.3	0	0
Hungary	146	142	97.3	80	54.8	23	15.8	1	0.7	65	44.5	3	2.1	0	0
Ireland	51	51	100	21	41.2	4	7.8	4	7.8	30	58.8	0	0	0	0
Italy[i]	108	108	100	85	78.7	27	25	2	1.9	24	22.2	1	0.9	0	0
Latvia[i]	70	70	100	40	57.1	5	7.1	0	0	30	42.9	0	0	0	0
Lithuania	84	84	100	47	56	17	20.2	1	1.2	38	45.2	1	1.2	0	0
Luxembourg	54	54	100	52	96.3	7	13	5	9.3	6	11.1	4	7.4	0	0
Malta	60	60	100	58	96.7	3	5	0	0	4	6.7	2	3.3	0	0
Netherlands[i]	15	15	100	12	80	1	6.7	0	0	6	40	3	20	0	0
Poland	105	104	99	61	58.1	15	14.3	1	1	48	45.7	5	4.8	0	0
Portugal	31	31	100	26	83.9	5	16.1	0	0	7	22.6	2	6.5	0	0
Romania	107	106	99.1	73	68.2	11	10.3	0	0	35	32.7	2	1.9	0	0
Slovakia	84	81	96.4	71	84.5	38	45.2	2	2.4	11	13.1	1	1.2	0	0
Slovenia	71	68	95.8	43	60.6	17	23.9	3	4.2	26	36.6	0	0	1	1.41
Spain	182	182	100	155	85.2	39	21.4	1	0.5	46	25.3	19	10.4	0	0
Sweden[i]	29	29	100	8	27.6	3	10.3	0	0	21	72.4	0	0	0	0
Total (27 MSs)	**1,977**	**1,960**	**99.1**	**1,465**	**74.1**	**478**	**24.2**	**25**	**1.3**	**562**	**28.4**	**66**	**3.3**	**1**	**0.05**
Norway[i]	9	9	100	0	0	0	0	0	0	9	100	0	0	0	0
UK	5	5	100	4	80	1	20	0	0	1	20	0	0	0	0

ESBL: extended-spectrum β-lactamase; n: isolates with this phenotype; %: percentage of isolates from the total tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were considered for further classification (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209). Thus, some of the isolates tested in Panel 2 do not show presumptive resistance phenotypes compatible with those defined for the present report.
(b): All isolates showing clavulanate synergy with cefotaxime, ceftazidime or with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).
(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.
(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.
(e): Isolates with microbiological resistance to cefoxitin, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).
(f): Isolates showing synergy with cefotaxime or ceftazidime and with microbiological resistance to cefoxitin, suggesting the presence of ESBL and AmpC enzymes in the same isolate. These isolates are also included in the ESBL and AmpC columns.
(g): Isolates with microbiological meropenem resistance.
(h): Percentage of the total number of *E. coli* isolates tested (with panel 2).
(i): Molecular data were provided by:
Denmark (3 CTX-M-1, 1 CTX-M-32, 1 CTX-M-55+TEM-1, 1 SHV-12, 1 SHV-12+TEM-1, 3 TEM-52, 3 CMY-2, 1 CMY-2+TEM-1, 1 AmpC mutation or insertion, and 1 AmpC mutation or insertion+TEM-1),
Italy (39 CTX-M-1, 4 CTX-M-14, 3 CTX-M-15, 1 CTX-M-2, 3 CTX-M-32, 6 CTX-M-55, 5 CTX-M-65, 22 SHV-12, 19 CMY-2, 1 SHV-12+CMY-2, 1 CTX-M-1+ AmpC-phenotype/genotype and 4 AmpC-phenotype/genotype),
Latvia (40 ESBL-genotype/phenotype, and 30 AmpC-phenotype/genotype),
The Netherlands (1 CTX-M-1, 1 CTX-M-1+TEM-1, 1 CTX-M-55, 1 SHV-12, 1 SHV-2+TEM-1, 1 SHV-52, 3 SHV-52+AmpC mutation or insertion, 1 TEM-52, 1 TEM-52+TEM-1+AmpC mutation or insertion, 1 CMY-2, 2 CMY-2+TEM-1, and 1 AmpC mutation or insertion),
Norway (3 CMY-2),
Sweden (6 CTX-M-1, 2 SHV-12, 1 SHV-12+CMY-2, 5 CMY-2, and 15 AmpC-phenotype/genotype with C-42T mutation).

Table 6: Prevalence of presumptive ESBL- and AmpC-producing *E. coli* isolates from broilers collected within the specific ESBLs/AmpC/Carbapenemase-producing monitoring and subjected to supplementary testing (panel 2) in 2020

Country	N_s	ESBL and/or AmpC[a]		ESBL[b]		ESBL only CTX/CLA SYN[c]		ESBL only CAZ/CLA SYN[d]		AmpC[e]		AmpC + ESBL[f]		CPs[g]	
		%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI
Austria	360	18.1	14.5-22.7	14	10.7-18.2	3.6	1.9-6.1	0	0-1	4.7	2.8-7.5	0.6	0.1-2	0.3	0-1.5
Belgium	257	76.6	69.3-80.3	74.6	67.3-78.5	6	3.3-9.4	3.6	1.6-6.5	5.2	2.7-8.5	3.2	1.4-6	0	0-1.4
Bulgaria	411	53.3	31.8-58.2	33.4	18.9-38.1	14.5	7.3-18.4	0.4	0-1.3	20.6	10.9-24.9	0.7	0.1-1.7	0	0-0.9
Croatia	175	51.4	41-56.2	36.3	27.3-41.8	23.6	16.4-29.2	0.6	0-3.1	15.1	9.5-20.4	0	0-2.1	0	0-2.1
Cyprus	152	27	20.1-34.8	23	16.6-30.5	9.2	5.1-15	0	0-2.4	5.3	2.3-10.1	1.3	0.2-4.7	0	0-2.4
Czechia	300	36	30.6-41.7	28	23-33.4	16.3	12.3-21	0	0-1.2	8.3	5.5-12.1	0.3	0-1.8	0	0-1.2
Denmark	308	2.6	1.1-5.1	1	0.2-2.8	0	0-1.2	0	0-1.2	1.6	0.5-3.7	0	0-1.2	0	0-1.2
Estonia	85	49.4	38.4-60.5	48.2	37.3-59.3	7.1	2.6-14.7	2.4	0.3-8.2	5.9	1.9-13.2	4.7	1.3-11.6	0	0-4.2
Finland	309	0.3	0-1.8	0.3	0-1.8	0	0-1.2	0	0-1.2	0	0-1.2	0	0-1.2	0	0-1.2
France	342	9.1	6.2-12.6	7.6	5-10.9	0.3	0-1.6	0.3	0-1.6	2.6	1.2-4.9	1.2	0.3-3	0	0-1.1
Germany	422	36	30.3-39.6	34.3	28.7-37.9	2.4	1.1-4.3	0.5	0.1-1.7	4.9	2.9-7.2	3.2	1.7-5.2	0	0-0.9
Greece	312	53.2	47.5-58.8	39.4	34-45.1	16	12.1-20.6	0	0-1.2	17.3	13.3-22	3.5	1.8-6.2	0	0-1.2
Hungary	300	40.3	34.7-46.1	19.7	15.3-24.6	6.7	4.1-10.1	0	0-1.2	21.3	16.8-26.4	0.7	0.1-2.4	0	0-1.2
Ireland	300	16	12-20.6	7.7	4.9-11.3	2.3	0.9-4.7	1	0.2-2.9	8.7	5.7-12.4	0.3	0-1.8	0	0-1.2
Italy	464	47.6	43-52.3	36	31.6-40.5	11	8.3-14.2	0.9	0.2-2.2	12.9	10-16.3	1.3	0.5-2.8	0	0-0.8
Latvia	150	45.3	37.2-53.7	24	17.4-31.6	0	0-2.4	0	0-2.4	22	15.7-29.5	0.7	0-3.7	0	0-2.4
Lithuania	150	87.3	80.9-92.2	60.7	52.4-68.5	8	4.2-13.6	0	0-2.4	26.6	19.8-34.5	0	0-2.4	0	0-2.4
Luxembourg	8	25	0.3-52.7	25	0.3-52.7	25	0.3-52.7	0	0-36.9	0	0-36.9	0	0-36.9	0	0-36.9
Malta	2	100	1.3-100	100	1.3-100	0	0-84.2	0	0-84.2	0	0-84.2	0	0-84.2	0	0-84.2
Netherlands	305	9.5	6.7-13.7	8.6	5.9-12.6	1	0.2-2.8	0	0-1.2	1.6	0.5-3.8	0.6	0.1-2.3	0	0-1.2
Poland	306	24.8	20.1-30.1	15.4	11.5-19.9	3.9	2-6.7	0	0-1.2	10.1	7-14.1	0.7	0.1-2.3	0	0-1.2
Portugal	262	53.4	46.1-58.5	52.6	45.3-57.7	7	4.1-10.6	0.4	0-2.1	7	4.1-10.6	6.3	3.5-9.7	0	0-1.4
Romania	813	61.7	56.6-63.4	39.8	35.4-42.2	9.5	7.3-11.4	0.5	0.1-1.3	23.8	20.3-26.2	1.9	1-3	0	0-0.5
Slovakia	147	98.6	94.2-99.6	77.4	69.2-83.4	49.3	40.7-57.3	2.1	0.4-5.8	22.6	16-30.1	1.4	0.2-4.8	0	0-2.5
Slovenia	153	70.6	62.7-77.7	49	40.9-57.2	19.6	13.6-26.8	0.6	0-3.6	21.6	15.3-28.9	0	0-2.4	0	0-2.4
Spain	444	53.4	48.6-58.1	48	43.2-52.7	8.5	6.1-11.6	0	0-0.8	7.6	5.4-10.5	2.2	1.1-4.1	0	0-0.8
Sweden	300	11	7.7-15.1	3.3	1.6-6	3	1.4-5.6	0	0-1.2	7.7	4.9-11.3	0	0-1.2	0	0-1.2
Total (27 MSs)	**7,537**	**39.6**	**37.1-40.7**	**29.7**	**27.6-29.7**	**8**	**7.2-8.4**	**0.4**	**0.3-0.6**	**11.4**	**10.3-11.7**	**1.4**	**1.1-1.7**	**0**	**0-0.1**
Iceland	149	0.7	0-3.7	0	0-2.4	0	0-2.4	0	0-2.4	0.7	0-3.7	0	0-2.4	0	0-2.4
Norway	242	0.4	0-2.3	0	0-1.5	0	0-1.5	0	0-1.5	0.4	0-2.3	0	0-1.5	0	0-1.5
Switzerland	612	9	6.8-11.5	4.4	2.9-6.4	1.5	0.7-2.8	0.7	0.2-1.7	4.6	3.1-6.5	0	0-0.6	0	0-0.6
United Kingdom	350	4.6	2.6-7.3	3.4	1.8-5.9	0	0-1	0.3	0-1.6	1.1	0.3-2.9	0	0-1	0	0-1

ESBL: extended-spectrum β-lactamase; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; P: prevalence; CI: confidence interval; MSs: Member States; N_s: total number of samples tested.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were considered for further classification (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209). Thus, some of the isolates tested in Panel 2 do not show presumptive resistance phenotypes compatible with those defined for the present report.
(b): All isolates showing clavulanate synergy with CTX or CAZ or synergy with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).
(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.
(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.
(e): Isolates with microbiological resistance to FOX, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).
(f): Isolates showing synergy with CTX or CAZ and microbiological resistance to FOX, suggesting ESBL and AmpC enzymes in the same isolate. ESBL and AmpC columns include those isolates.
(g): Isolates with microbiological meropenem resistance.

Table 7: Occurrence of presumptive ESBL- and AmpC-producing *E. coli* isolates from broilers collected within the specific ESBLs-/AmpC-/carbapenemase-producing monitoring and subjected to supplementary testing (panel 2) in 2020

Country	N_{P2}	ESBL and/or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		AmpC +ESBL[f]		CPs[g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Austria	67	66	98.5	51	76.1	13	19.4	0	0	17	25.4	2	3	1	1.49
Belgium	201	193	96	188	93.5	15	7.5	9	4.5	13	6.5	8	4	0	0
Bulgaria	150	150	100	94	62.7	41	27.3	1	0.7	58	38.7	2	1.3	0	0
Croatia	85	85	100	60	70.6	39	45.9	1	1.2	25	29.4	0	0	0	0
Cyprus	41	41	100	35	85.4	14	34.1	0	0	8	19.5	2	4.9	0	0
Czechia	108	108	100	84	77.8	49	45.4	0	0	25	23.1	1	0.9	0	0
Denmark[i]	8	8	100	3	37.5	0	0	0	0	5	62.5	0	0	0	0
Estonia	42	42	100	41	97.6	6	14.3	2	4.8	5	11.9	4	9.5	0	0
Finland	1	1	100	1	100	0	0	0	0	0	0	0	0	0	0
France	33	31	93.9	26	78.8	1	3	1	3	9	27.3	4	12.1	0	0
Germany	149	147	98.7	140	94	10	6.7	2	1.3	20	13.4	13	8.7	0	0
Greece	166	166	100	123	74.1	50	30.1	0	0	54	32.5	11	6.6	0	0
Hungary	121	121	100	59	48.8	20	16.5	0	0	64	52.9	2	1.7	0	0
Ireland	49	48	98	23	46.9	7	14.3	3	6.1	26	53.1	1	2	0	0
Italy[i]	221	221	100	167	75.6	51	23.1	4	1.8	60	27.1	6	2.7	0	0
Latvia[i]	68	68	100	36	52.9	0	0	0	0	33	48.5	1	1.5	0	0
Lithuania	131	131	100	91	69.5	12	9.2	0	0	40	30.5	0	0	0	0
Luxembourg	1	1	100	1	100	1	100	0	0	0	0	0	0	0	0
Malta	1	1	100	1	100	0	0	0	0	0	0	0	0	0	0
Netherlands[i]	31	30	96.8	27	87.1	3	9.7	0	0	5	16.1	2	6.5	0	0
Poland	80	76	95	47	58.8	12	15	0	0	31	38.8	2	2.5	0	0
Portugal	137	137	100	135	98.5	18	13.1	1	0.7	18	13.1	16	11.7	0	0
Romania	497	488	98.2	315	63.4	75	15.1	4	0.8	188	37.8	15	3	0	0
Slovakia	146	144	98.6	113	77.4	72	49.3	3	2.1	33	22.6	2	1.4	0	0
Slovenia	110	108	98.2	75	68.2	30	27.3	1	0.9	33	30	0	0	0	0
Spain	237	237	100	213	89.9	38	16	0	0	34	14.3	10	4.2	0	0
Sweden[i]	34	33	97.1	10	29.4	9	26.5	0	0	23	67.6	0	0	0	0
Total (27 MSs)	**2,915**	**2,882**	**98.9**	**2,159**	**74.1**	**586**	**20.1**	**32**	**1.1**	**827**	**28.4**	**104**	**3.6**	**1**	**0.03**
Iceland[i]	1	1	1	100	0	0	0	0	0	0	1	100	0	0	0
Norway[i]	1	1	1	100	0	0	0	0	0	0	1	100	0	0	0
Switzerland	61	61	55	90.2	27	44.3	9	14.8	4	6.6	28	45.9	0	0	0
United Kingdom	17	17	16	94.1	12	70.6	0	0	1	5.9	4	23.5	0	0	0

ESBL: extended-spectrum β-lactamase; n: isolates with this phenotype; %: percentage of isolates from the total tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were considered for further classification (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209). Thus, some of the isolates tested in Panel 2 do not show presumptive resistance phenotypes compatible with those defined for the present report.

(b): All isolates showing clavulanate synergy with cefotaxime, ceftazidime or with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).

(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.

(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.

(e): Isolates with microbiological resistance to cefoxitin, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).

(f): Isolates showing synergy with cefotaxime or ceftazidime and with microbiological resistance to cefoxitin, suggesting the presence of ESBL and AmpC enzymes in the same isolate. These isolates are also included in the ESBL and AmpC columns.

(g): Isolates with microbiological meropenem resistance.

(h): Percentage of the total number of *E. coli* isolates tested (with panel 2).

(i): Molecular data were provided by:
Denmark (1 CTX-M-1, 1 CTX-M-14, 1 SHV-12, 1 DHA-1, 2 AmpC mutation or insertion+TEM-1, and 2 AmpC mutation or insertion),
Iceland (1 CMY-2),
Italy (1 CTX-M, 63 CTX-M-1, 1 CTX-M-1+AmpC-phenotype/genotype, 7 CTX-M-14, 24 CTX-M-15, 6 CTX-M-32, 11 CTX-M-55, 6 CTX-M-65, 1 CTX-M-8, 2 SHV, 48 SHV-12, 44 CMY-2, and 9 AmpC-genotype/phenotype),
Latvia (35 ESBL-phenotype/genotype and 34 AmpC-phenotype/genotype),
The Netherlands (11 CTX-M-1, 2 CTX-M-14, 1 CTX-M-15+TEM-135, 1 CTX-M-32, 8 SHV-12, 1 SHV-12+TEM-1, 1 SHV-12+TEM-135, 2 TEM-52, 1 TEM-52+TEM-1, 2 CMY-2+TEM-1, and 1 AmpC-phenotype/genotype),
Norway (1 CMY-2),
Sweden (10 CTX-M-1, 1 TEM-1, 22 AmpC-phenotype/genotype with C-42T mutation, and 1 AmpC-phenotype/genotype with T-32A mutation).

Table 8: Prevalence of presumptive ESBL- and AmpC-producing *E. coli* isolates from fattening turkeys collected within the specific ESBLs-/AmpC-/carbapenemase-producing monitoring and subjected to supplementary testing (panel 2) in 2020

Country	N_s	ESBL and/or AmpC[(a)]		ESBL[(b)]		ESBL only CTX/CLA SYN[(c)]		ESBL only CAZ/CLA SYN[(d)]		AmpC[(e)]		AmpC + ESBL[(f)]		CPs[(g)]	
		%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI
Austria	276	24.3	19.7-30.2	20.4	16-25.9	2.9	1.3-5.6	0	0-1.3	4.3	2.3-7.5	0.3	0-2	0	0-1.3
Belgium	151	46.4	36.3-52.7	40.1	30.6-46.7	0.7	0-3.6	2.8	0.7-6.6	8.3	4.2-13.5	2.1	0.4-5.7	0	0-2.4
France	295	5.8	3.4-9.1	5.1	2.9-8.2	0.3	0-1.9	0	0-1.2	1.4	0.4-3.4	0.7	0.1-2.4	0	0-1.2
Germany	433	43.9	36-45.4	41.2	33.5-42.9	2	0.8-3.6	0	0-0.8	6	3.6-8.1	3.2	1.6-5.1	0	0-0.8
Hungary	300	16.7	12.6-21.4	11.3	8-15.5	4.7	2.6-7.7	0	0-1.2	5.3	3.1-8.5	0	0-1.2	0	0-1.2
Italy	453	40.2	35.6-44.9	35.6	31.1-40.1	10.6	7.9-13.8	0.4	0.1-1.6	5.3	3.4-7.8	0.6	0.1-1.9	0	0-0.8
Poland	307	22.8	18.2-27.9	19.2	15-24.1	2.3	0.9-4.6	0	0-1.2	5.9	3.5-9.1	2.3	0.9-4.6	0	0-1.2
Portugal	189	46.6	37.2-51.8	42.1	33.2-47.6	9.4	5.3-14	0	0-1.9	8.3	4.5-12.8	3.9	1.5-7.5	0	0-1.9
Romania	31	45.2	27.3-64	45.2	27.3-64	45.2	27.3-64	0	0-11.2	6.5	0.8-21.4	6.5	0.8-21.4	0	0-11.2
Spain	277	70.4	63.9-75	68.6	62-73.3	0.7	0.1-2.6	0	0-1.3	5.8	3.3-9.2	4	2-7	0	0-1.3
Sweden	45	0	0-7.9	0	0-7.9	0	0-7.9	0	0-7.9	0	0-7.9	0	0-7.9	0	0-7.9
Total (11 MSs)	**2,757**	**34.2**	31.6-35.2	**30.7**	28.3-31.7	**4.5**	3.6-5.2	**0.2**	0.1-0.5	**5.3**	4.4-6.1	**1.8**	1.3-2.3	0	0-0.1
Norway	121	7.4	3.5-13.7	0	0-3	0	0-3	0	0-3	7.4	3.5-13.7	0	0-3	0	0-3
United Kingdom	334	1.8	0.5-3.5	1.4	03.-3	0.4	0-1.7	0	0-1.1	0.4	0-1.7	0	0.1-1	0	0-1.1

ESBL: extended-spectrum β-lactamase; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; P: prevalence; CI: confidence interval; MSs: Member States; N_s: total number of samples tested.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were considered for further classification (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209). Thus, some of the isolates tested in Panel 2 do not show presumptive resistance phenotypes compatible with those defined for the present report.

(b): All isolates showing clavulanate synergy with CTX or CAZ or synergy with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).

(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.

(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.

(e): Isolates with microbiological resistance to FOX, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).

(f): Isolates showing synergy with CTX or CAZ and microbiological resistance to FOX, suggesting ESBL and AmpC enzymes in the same isolate. ESBL and AmpC columns include those isolates.

(g): Isolates with microbiological meropenem resistance.

Table 9: Occurrence of presumptive ESBL- and AmpC-producing *E. coli* isolates from fattening turkeys collected within the specific ESBLs/AmpC/Carbapenemase-producing monitoring and subjected to supplementary testing (panel 2) in 2020

Country	N_{P2}	ESBL and/or AmpC[(a)]		ESBL[(b)]		ESBL only CLA/CTX SYN[(c)]		ESBL only CLA/CAZ SYN[(d)]		AmpC[(e)]		AmpC + ESBL[(f)]		CPs[(g)]	
		n	%[(h)]	n	%[(h)]	n	%[(h)]	n	%[(h)]	n	%[(h)]	n	%[(h)]	n	%[(h)]
Austria	69	68	98.6	57	82.6	8	11.6	0	0	12	17.4	1	1.4	0	0
Belgium	67	67	100	58	86.6	1	1.5	4	6	12	17.9	3	4.5	0	0
France	17	17	100	15	88.2	1	5.9	0	0	4	23.5	2	11.8	0	0
Germany	176	176	100	165	93.8	8	4.5	0	0	24	13.6	13	7.4	0	0
Hungary	51	50	98	34	66.7	14	27.5	0	0	16	31.4	0	0	0	0
Italy[(i)]	182	182	100	161	88.5	48	26.4	2	1.1	24	13.2	3	1.6	0	0
Poland	71	70	98.6	59	83.1	7	9.9	0	0	18	25.4	7	9.9	0	0
Portugal	84	84	100	76	90.5	17	20.2	0	0	15	17.9	7	8.3	0	0
Romania	14	14	100	14	100	14	100	0	0	2	14.3	2	14.3	0	0
Spain	193	193	100	188	97.4	2	1	0	0	16	8.3	11	5.7	0	0
Total (10 MSs)	**924**	**921**	**99.7**	**827**	**89.5**	**120**	**13**	**6**	**0.6**	**143**	**15.5**	**49**	**5.3**	**0**	**0**
Norway[(i)]	9	9	100	0	0	0	0	0	0	9	100	0	0	0	0
United Kingdom	5	5	100	4	80	1	20	0	0	1	20	0	0	0	0

ESBL: extended-spectrum β-lactamase; n: isolates with this phenotype; %: percentage of isolates from the total tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were considered for further classification (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209). Thus, some of the isolates tested in Panel 2 do not show presumptive resistance phenotypes compatible with those defined for the present report.

(b): All isolates showing clavulanate synergy with cefotaxime, ceftazidime or with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).

(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.

(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.

(e): Isolates with microbiological resistance to cefoxitin, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).

(f): Isolates showing synergy with cefotaxime or ceftazidime and with microbiological resistance to cefoxitin, suggesting the presence of ESBL and AmpC enzymes in the same isolate. These isolates are also included in the ESBL and AmpC columns.

(g): Isolates with microbiological meropenem resistance.

(h): Percentage of the total number of *E. coli* isolates tested (with panel 2).

(i): Molecular data were provided by Italy (5 CTX-M, 67 CTX-M-1, 5 CTX-M-14, 35 CTX-M-15, 2 CTX-M-32, 5 CTX-M-55, 7 CTX-M-65, 1 CTX-M-8, 1 SHV, 35 SHV-12, 1 OXA-1, 17 CMY-2, 1 CMY-2+OXA-1, and 3 isolates with AmpC phenotype/genotype)
Norway (9 AmpC mutation or insertion).

D.3. ESBL-, AmpC-producers prevalence and occurrence tables – pigs and cattle and meat thereof, 2019

The 2019 tables included in this Annex were published in EFSA and ECDC, 2021[2].

Table 10: Presumptive ESBL- and AmpC-producing *Salmonella* spp. isolates from meat from fattening pigs (carcases) collected within the routine monitoring and subjected to supplementary testing (panel 2) in 2019

Country	N_{P1}	N_{P2}	ESBL and/or AmpC (a)		ESBL (b)		ESBL only CTX/CLA SYN (c)		ESBL only CAZ/CLA SYN (d)		AmpC (e)		AmpC + ESBL (f)		CPs (g)	
			n	%(h)	n	%(h)	n	%(h)	n	%(h)	n	%(h)	n	%(h)	n	%(h)
Czechia	11	1	1	9.1	0	0	0	0	0	0	1	9.1	0	0	0	0
Italy	197	2	2	1	2	1	0	0	0	0	0	0	0	0	0	0
Romania	3	1	1	33.3	1	33.3	0	0	0	0	0	0	0	0	0	0
Total (3 MSs)	**211**	**4**	**4**	**1.9**	**3**	**1.4**	**0**	**0**	**0**	**0**	**1**	**0.5**	**0**	**0**	**0**	**0**

ESBL: extended-spectrum β-lactamase; n: isolates with this phenotype; %: percentage of isolates with this phenotype from the total tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; N_{P1} and N_{P2}: Total number of isolates tested with panel 1 and panel 2, respectively.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were considered (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209).

(b): All isolates showing clavulanate synergy with cefotaxime, ceftazidime or with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).

(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.

(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.

(e): Isolates with microbiological resistance to cefoxitin, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).

(f): Isolates showing synergy with cefotaxime or ceftazidime and with microbiological resistance to cefoxitin, suggesting the presence of ESBL and AmpC enzymes in the same isolate. These isolates are also included in the ESBL and AmpC columns.

(g): Isolates with microbiological meropenem resistance.

(h): Percentage of the total number of *Salmonella* spp. isolates tested (with panel 1).

[2] https://efsa.onlinelibrary.wiley.com/doi/XXXX

Table 11: Presumptive ESBL- and AmpC-producing indicator *E. coli* isolates from fattening pigs collected within the routine monitoring and subjected to supplementary testing (panel 2) in 2019

Country	N_{P1}	N_{P2}	ESBL and/or AmpC[a]		ESBL[b]		ESBL only CTX/CLA SYN[c]		ESBL only CAZ/CLA SYN[d]		AmpC[e]		AmpC + ESBL[f]		CPs[g]	
			n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Austria	174	2	2	1.1	2	1.1	1	0.6	0	0	0	0	0	0	0	0
Belgium	175	3	1	0.6	1	0.6	1	0.6	0	0	0	0	0	0	0	0
Croatia	85	1	1	1.2	1	1.2	1	1.2	0	0	0	0	0	0	0	0
Czechia	313	3	3	1	1	0.3	0	0	0	0	2	0.6	0	0	0	0
Estonia	71	1	1	1.4	0	0	0	0	0	0	1	1.4	0	0	0	0
Finland	174	1	1	0.6	0	0	0	0	0	0	1	0.6	0	0	0	0
France	188	2	2	1.1	2	1.1	0	0	0	0	0	0	0	0	0	0
Germany	246	8	7	2.8	7	2.8	1	0.4	0	0	0	0	0	0	0	0
Greece	146	2	2	1.4	2	1.4	1	0.7	0	0	0	0	0	0	0	0
Hungary	170	3	3	1.8	3	1.8	3	1.8	0	0	0	0	0	0	0	0
Ireland	170	2	2	1.2	1	0.6	0	0	0	0	1	0.6	0	0	0	0
Italy	169	1	1	0.6	1	0.6	0	0	1	0.6	0	0	0	0	0	0
Latvia	152	1	1	0.7	1	0.7	1	0.7	0	0	0	0	0	0	0	0
Malta	71	1	1	1.4	1	1.4	0	0	0	0	0	0	0	0	0	0
Poland	175	1	1	0.6	1	0.6	0	0	0	0	0	0	0	0	0	0
Portugal	156	8	7	4.5	7	4.5	0	0	0	0	0	0	0	0	0	0
Romania	170	10	10	5.9	4	2.4	4	2.4	0	0	6	3.5	0	0	0	0
Slovenia	85	3	3	3.5	1	1.2	1	1.2	0	0	2	2.4	0	0	0	0
Spain	170	4	3	1.8	3	1.8	0	0	0	0	0	0	0	0	0	0
United Kingdom	208	5	5	2.4	4	1.9	0	0	0	0	1	0.5	0	0	0	0
Total (20 MSs)	**3,268**	**62**	**57**	**1.7**	**43**	**1.3**	**14**	**0.4**	**1**	**0.03**	**14**	**0.4**	**0**	**0**	**0**	**0**

ESBL: extended-spectrum β-lactamase; n: isolates with this phenotype; %: percentage of isolates from the total tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; N_{P1} and N_{P2}: Total number of isolates tested with panel 1 and panel 2, respectively.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209).

(b): All isolates showing clavulanate synergy with cefotaxime, ceftazidime or with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).

(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.

(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.

(e): Isolates with microbiological resistance to cefoxitin, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).

(f): Isolates showing synergy with cefotaxime or ceftazidime and with microbiological resistance to cefoxitin, suggesting the presence of ESBL and AmpC enzymes in the same isolate. These isolates are also included in the ESBL and AmpC columns.

(g): Isolates with microbiological meropenem resistance.

(h): Percentage of the total number of *E. coli* isolates tested (with panel 1).

Table 12: Presumptive ESBL and AmpC-producing indicator *E. coli* isolates from calves under 1 year of age collected within the routine monitoring and subjected to supplementary testing (panel 2) in 2019

Country	N_{P1}	N_{P2}	ESBL and/or AmpC[a]		ESBL[b]		ESBL only CTX/CLA SYN[c]		ESBL only CAZ/CLA SYN[d]		AmpC[e]		AmpC + ESBL[f]		CPs[g]	
			n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Belgium	172	6	3	1.7	3	1.7	0	0	2	1.2	0	0	0	0	0	0
Germany	217	5	4	1.8	3	1.4	1	0.5	0	0	1	0.5	0	0	0	0
Italy	169	7	7	4.1	7	4.1	4	2.4	0	0	0	0	0	0	0	0
Portugal	174	4	3	1.7	3	1.7	0	0	0	0	0	0	0	0	0	0
Spain	170	1	1	0.6	1	0.6	0	0	0	0	0	0	0	0	0	0
Total (5 MSs)	**902**	**23**	**18**	**2**	**17**	**2**	**5**	**1**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**0**
Norway	314	1	1	0.3	0	0	0	0	0	0	1	0.3	0	0	0	0
Rep. of North Macedonia	18	1	1	5.6	1	5.6	1	5.6	0	0	0	0	0	0	0	0
Switzerland	199	2	2	1	2	1	1	0.5	0	0	0	0	0	0	0	0

ESBL: extended-spectrum β-lactamase; n: isolates with this phenotype; %: percentage of isolates from the total tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States. N_{P1} and N_{P2}: Total number of isolates tested with panel 1 and panel 2, respectively.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were considered (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209).

(a): All isolates showing clavulanate synergy with cefotaxime, ceftazidime or with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).

(b): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.

(c): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.

(d): Isolates with microbiological resistance to cefoxitin, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).

(e): Isolates showing synergy with cefotaxime or ceftazidime and with microbiological resistance to cefoxitin, suggesting the presence of ESBL and AmpC enzymes in the same isolate. These isolates are also included in the ESBL and AmpC columns.

(f): Isolates with microbiological meropenem resistance.

(g): Percentage of the total number of *E. coli.* isolates tested (with panel 1).

Table 13: Prevalence of presumptive ESBL- and/or AmpC-producing *E. coli* isolates in meat from pigs (retail) collected within the specific ESBLs-/AmpC-/carbapenemase-producing monitoring and subjected to supplementary testing (panel 2) in 2019

Country	N_s	ESBL and/or AmpC[a]		ESBL[b]		ESBL only CTX/CLA SYN[c]		ESBL only CAZ/CLA SYN[d]		AmpC[e]		AmpC + ESBL[f]		CPs[g]	
		%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI
Austria	318	9.8	6.7-13.6	9.1	6.2-12.8	3.5	1.7-6.1	0	0-1.2	0.6	0.1-2.3	0	0-1.2	0	0-1.2
Belgium	300	2.7	0.9-4.7	2.3	0.7-4.3	1.1	0.2-2.9	0	0-1.2	0.8	0.1-2.4	0.4	0-1.8	0	0-1.2
Bulgaria	150	19.3	13.3-26.6	19.3	13.3-26.6	7.3	3.7-12.7	0.7	0-3.7	0	0-2.4	0	0-2.4	0	0-2.4
Croatia	126	7.1	3.3-13.1	4.8	1.8-10.1	1.6	0.2-5.6	0	0-2.9	2.4	0.5-6.8	0	0-2.9	0	0-2.9
Cyprus	149	1.3	0.2-4.8	0.7	0-3.7	0	0-2.4	0	0-2.4	1.3	0.2-4.8	0.7	0-3.7	0	0-2.4
Czechia	297	9.4	6.4-13.3	6.7	4.2-10.2	4.4	2.4-7.4	0	0-1.2	2.7	1.2-5.2	0	0-1.2	0	0-1.2
Denmark	353	6.8	4.4-9.9	2.8	1.4-5.1	1.7	0.6-3.7	0	0-1	4	2.2-6.6	0	0-1	0	0-1
Estonia	150	3.3	1.1-7.6	2	0.4-5.7	0.7	0-3.7	0	0-2.4	1.3	0.2-4.7	0	0-2.4	0	0-2.4
Finland	306	0	0-1.2	0	0-1.2	0	0-1.2	0	0-1.2	0	0-1.2	0	0-1.2	0	0-1.2
France	322	1.2	0.3-3.1	1.2	0.3-3.1	0.6	0.1-2.2	0	0-1.1	0.3	0-1.7	0.3	0-1.7	0	0-1.1
Germany	512	5.7	3-6.9	4.5	2.2-5.7	1.4	0.4-2.5	0	0-0.7	1.2	0.3-2.3	0	0-0.7	0	0-0.7
Greece	216	6	3.2-10.1	6	3.2-10.1	0.5	0-2.6	0	0-1.7	0	0-1.7	0	0-1.7	0	0-1.7
Hungary	278	10.8	7.4-15	8.6	5.6-12.6	2.2	0.8-4.6	0	0-1.3	2.5	1-5.1	0.4	0-2	0	0-1.3
Ireland	300	3.3	1.6-6	2.7	1.2-5.2	1.7	0.5-3.8	0	0-1.2	1	0.2-2.9	0.3	0-1.8	0	0-1.2
Italy	340	10	7-13.7	8.8	6-12.4	2.4	1-4.6	0	0-1.1	1.2	0.3-3	0	0-1.1	0	0-1.1
Latvia	152	15.8	10.9-23.3	13.9	9.3-21.1	5.7	2.7-10.9	0	0-2.4	1.9	0.4-5.7	0	0-2.4	0	0-2.4
Lithuania	150	8.7	4.7-14.4	7.3	3.7-12.7	1.3	0.2-4.7	0	0-2.4	1.3	0.2-4.7	0	0-2.4	0	0-2.4
Luxembourg	66	1.5	0-8.2	1.5	0-8.2	0	0-5.4	0	0-5.4	0	0-5.4	0	0-5.4	0	0-5.4
Malta	101	5	1.6-11.2	5	1.6-11.2	0	0-3.6	0	0-3.6	2	0.2-7	2	0.2-7	0	0-3.6
Netherlands	296	0	0-1.2	0	0-1.2	0	0-1.2	0	0-1.2	0	0-1.2	0	0-1.2	0	0-1.2
Poland	305	6.9	4.3-10.3	5.6	3.3-8.8	2	0.7-4.2	0	0-1.2	2	0.7-4.2	0.7	0.1-2.3	0	0-1.2
Portugal	127	24.4	17.2-32.8	22	15.2-30.3	5.5	2.2-11	0	0-2.9	5.5	2.2-11	3.1	0.9-7.9	0	0-2.9
Romania	300	7.3	4.7-10.9	6.7	4.1-10.1	0.3	0-1.8	0	0-1.2	1	0.2-2.9	0.3	0-1.8	0	0-1.2
Slovakia	150	11.3	6.7-17.5	7.3	3.7-12.7	2.7	0.7-6.7	0	0-2.4	4	1.5-8.5	0	0-2.4	0	0-2.4
Slovenia	151	15.9	10.5-22.7	9.9	5.7-15.9	4	1.5-8.4	0	0-2.4	6	2.8-11	0	0-2.4	0	0-2.4
Spain	300	15.3	6.6-19.9	13.2	5.5-17.7	4.2	1.2-5.2	0	0-1.2	2.6	0.5-3.8	0.5	0-1.8	0	0-1.2
Sweden	293	0.7	0.1-2.4	0.7	0.1-2.4	0	0-1.3	0	0-1.3	0	0-1.3	0	0-1.3	0	0-1.3
United Kingdom	285	1.1	0.2-3	0.7	0.1-2.5	0.7	0.1-2.5	0	0-1.3	0.4	0-1.9	0	0-1.3	0	0-1.3
Total (28 MSs)	**6,793**	**6.8**	**5.9-7.1**	**5.6**	**4.8-5.9**	**1.9**	**1.5-2.1**	**0**	**0-0.1**	**1.5**	**1.2-1.7**	**0.2**	**0.1-0.4**	**0**	**0-0.1**
Iceland	148	0	0-2.5	0	0-2.5	0	0-2.5	0	0-2.5	0	0-2.5	0	0-2.5	0	0-2.5
Norway	352	0	0-1	0	0-1	0	0-1	0	0-1	0	0-1	0	0-1	0	0-1
Switzerland	311	0.6	0.1-2.3	0.3	0-1.8	0	0-1.2	0	0-1.2	0.3	0-1.8	0	0-1.2	0	0-1.2

ESBL: extended-spectrum β-lactamase; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; N_S: total number of samples tested.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for CTX and/or CAZ (screening breakpoint) were considered (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209).

(b): All isolates showing clavulanate synergy with CTX or CAZ or synergy with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).

(c): Isolates showing synergy with CTX only, suggesting the presence of an ESBL with cefotaximase activity.

(d): Isolates showing synergy with CAZ only, suggesting the presence of an ESBL with ceftazidimase activity.

(e): Isolates with microbiological resistance to FOX, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).

(f): Isolates showing synergy with CTX or CAZ and microbiological resistance to FOX, suggesting ESBL and AmpC enzymes in the same isolate. ESBL and AmpC columns include those isolates.

(g): Isolates with microbiological meropenem resistance.

Table 14: Occurrence of presumptive ESBL- and/or AmpC-producing *E. coli* isolates in meat from pigs (retail) collected within the specific ESBLs-/AmpC-/carbapenemase-producing monitoring and subjected to supplementary testing (panel 2) in 2019

Country	N	ESBL and/or AmpC[a]		ESBL[b]		ESBL only CTX/CLA SYN[c]		ESBL only CAZ/CLA SYN[d]		AmpC[e]		AmpC + ESBL[f]		CPs[g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Austria	32	31	96.9	29	90.6	11	34.4	0	0	2	6.3	0	0	0	0
Belgium	7	7	100	6	85.7	3	42.9	0	0	2	28.6	1	14.3	0	0
Bulgaria	29	29	100	29	100	11	37.9	1	3.4	0	0	0	0	0	0
Croatia	9	9	100	6	66.7	2	22.2	0	0	3	33.3	0	0	0	0
Cyprus	2	2	100	1	50	0	0	0	0	2	100	1	50	0	0
Czechia	28	28	100	20	71.4	13	46.4	0	0	8	28.6	0	0	0	0
Denmark	24	24	100	10	41.7	6	25	0	0	14	58.3	0	0	0	0
Estonia	5	5	100	3	60	1	20	0	0	2	40	0	0	0	0
Finland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
France	4	4	100	4	100	2	50	0	0	1	25	1	25	0	0
Germany	24	24	100	19	79.2	6	25	0	0	5	20.8	0	0	0	0
Greece	13	13	100	13	100	1	7.7	0	0	0	0	0	0	0	0
Hungary	30	30	100	24	80	6	20	0	0	7	23.3	1	3.3	0	0
Ireland	10	10	100	8	80	5	50	0	0	3	30	1	10	0	0
Italy	34	34	100	30	88.2	8	23.5	0	0	4	11.8	0	0	0	0
Latvia	25	25	100	22	88	9	36	0	0	3	12	0	0	0	0
Lithuania	13	13	100	11	84.6	2	15.4	0	0	2	15.4	0	0	0	0
Luxembourg	1	1	100	1	100	0	0	0	0	0	0	0	0	0	0
Malta	5	5	100	5	100	0	0	0	0	2	40	2	40	0	0
Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poland	21	21	100	17	81	6	28.6	0	0	6	28.6	2	9.5	0	0
Portugal	31	31	100	28	90.3	7	22.6	0	0	7	22.6	4	12.9	0	0
Romania	22	22	100	20	90.9	1	4.5	0	0	3	13.6	1	4.5	0	0
Slovakia	17	17	100	11	64.7	4	23.5	0	0	6	35.3	0	0	0	0
Slovenia	24	24	100	15	62.5	6	25	0	0	9	37.5	0	0	0	0
Spain	29	29	100	25	86.2	8	27.6	0	0	5	17.2	1	3.4	0	0
Sweden	2	2	100	2	100	0	0	0	0	0	0	0	0	0	0
United Kingdom	3	3	100	2	66.7	2	66.7	0	0	1	33.3	0	0	0	0
Total (28 MSs)	**444**	**443**	**99.8**	**361**	**81.3**	**120**	**27**	**1**	**0.2**	**97**	**21.8**	**15**	**3.4**	**0**	**0**
Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Norway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Switzerland	2	2	100	1	50	0	0	0	0	1	50	0	0	0	0

ESBL: extended-spectrum β-lactamase; n: isolates with this phenotype; %: percentage of isolates from the total tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States. N_{P2}: Total number of isolates tested with panel 2.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were considered (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209).
(b): All isolates showing clavulanate synergy with cefotaxime, ceftazidime or with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).
(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.
(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.
(e): Isolates with microbiological resistance to cefoxitin, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).
(f): Isolates showing synergy with cefotaxime or ceftazidime and with microbiological resistance to cefoxitin, suggesting the presence of ESBL and AmpC enzymes in the same isolate. These isolates are also included in the ESBL and AmpC columns.
(g): Isolates with microbiological meropenem resistance.
(h): Percentage of the total number of *E. coli* isolates tested (with panel 2).

Table 15: Prevalence of presumptive ESBL- and/or AmpC-producing *E. coli* isolates from fattening pigs collected within the specific ESBLs-/AmpC-/carbapenemase-producing monitoring and subjected to supplementary testing (panel 2) in 2019

Country	N_s	ESBL and/or AmpC [a]		ESBL [b]		ESBL only CTX/CLA SYN [c]		ESBL only CAZ/CLA SYN [d]		AmpC [e]		AmpC + ESBL [f]		CPs [g]	
		%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI
Austria	313	61.3	55.7-66.8	56.9	51.2-62.4	13.7	10.1-18.1	0.3	0-1.8	5.1	2.9-8.2	0.6	0.1-2.3	0	0-1.2
Belgium	297	48.7	40.4-52	40.2	32.5-43.8	17	12.2-20.9	1.8	0.5-3.9	9.3	5.8-12.6	0.7	0.1-2.4	0	0-1.2
Bulgaria	153	51.6	43.4-59.8	51.6	43.4-59.8	17	11.4-23.9	0.6	0-3.6	0.6	0-3.6	0.6	0-3.6	0	0-2.4
Croatia	393	64.9	17.4-69.6	51	13.2-55.9	22.4	5-26.8	0.8	0-1.4	14.7	2.9-18.7	0.8	0-1.4	0	0-0.9
Cyprus	140	2.1	0.4-6.1	2.1	0.4-6.1	0	0-2.6	0	0-2.6	0	0-2.6	0	0-2.6	0	0-2.6
Czechia	320	33.8	28.6-39.2	22.8	18.3-27.8	8.7	5.9-12.4	0	0-1.1	11.2	8-15.2	0.3	0-1.7	0	0-1.1
Denmark	330	27	22-31.8	7.4	4.7-10.6	3.7	1.9-6.3	0	0-1.1	19.6	15.3-24.1	0	0-1.1	0	0-1.1
Estonia	74	48.7	36.9-60.6	29.8	19.7-41.5	2.7	0.3-9.4	0	0-4.9	18.9	10.7-29.7	0	0-4.9	0	0-4.9
Finland	288	2.4	1-4.9	0.3	0-1.9	0.3	0-1.9	0	0-1.3	2.1	0.8-4.5	0	0-1.3	0	0-1.3
France	299	21.7	17.2-26.9	17.4	13.3-22.2	2.7	1.2-5.2	0.3	0-1.8	5	2.8-8.1	0.7	0.1-2.4	0	0-1.2
Germany	391	50.6	45.6-55.7	44	39-49.1	5.6	3.6-8.4	0	0-0.9	7.1	4.8-10.2	0.5	0.1-1.8	0	0-0.9
Greece	153	39.2	31.4-47.4	36	28.4-44.1	2	0.4-5.6	0	0-2.4	3.9	1.5-8.3	0.7	0-3.6	0	0-2.4
Hungary	294	66.3	60.6-71.7	61.9	56.1-67.5	16	12-20.7	0.3	0-1.9	6.4	3.9-9.9	2.1	0.8-4.4	0	0-1.2
Ireland	300	44.3	37.6-49.1	30.3	25.2-35.9	12	8.5-16.2	0	0-1.2	14	10.3-18.4	1	0.2-2.9	0	0-1.2
Italy	266	99.2	97.3-99.9	85	80.1-89	17.7	13.3-22.8	0.8	0.1-2.7	15	11-19.9	0.8	0.1-2.7	0	0-1.4
Latvia	152	54	45.7-62.1	50	41.8-58.2	12.5	7.7-18.8	0	0-2.4	3.9	1.5-8.4	0	0-2.4	0	0-2.4
Lithuania	159	23.3	16.9-30.6	19.5	13.6-26.5	3.8	1.4-8	0	0-2.3	3.8	1.4-8	0	0-2.3	0	0-2.3
Luxembourg	38	52.6	35.8-69	44.7	28.6-61.7	15.8	6-31.3	0	0-9.3	7.9	1.7-21.4	0	0-9.3	0	0-9.3
Malta	72	48.6	35.3-59.3	47.2	34-58	7.1	2.3-15.5	1.4	0-7.5	1.4	0-7.5	0	0-5	0	0-5
Netherlands	304	16.8	12.8-21.5	8.9	5.9-12.7	2.3	0.9-4.7	0	0-1.2	7.9	5.1-11.5	0	0-1.2	0	0-1.2
Poland	308	43.8	38.2-49.6	28.9	23.9-34.3	6.2	3.8-9.5	1.3	0.4-3.3	17.8	13.7-22.6	2.9	1.3-5.5	0	0-1.2
Portugal	239	74.5	63.6-75.6	69.1	58.4-70.9	10.3	6.2-14.1	0	0-1.5	13.9	9-17.9	8.5	4.9-12.1	0	0-1.5
Romania	222	75.7	69.5-81.2	53.6	46.8-60.3	16.2	11.6-21.7	0	0-1.6	24.3	18.8-30.5	2.3	0.7-5.2	0	0-1.6
Slovakia	150	52	43.7-60.2	40.7	32.7-49	17.3	11.6-24.4	0.7	0-3.7	12	7.3-18.3	0.7	0-3.7	0	0-2.4
Slovenia	150	60.7	52.4-68.5	32.7	25.2-40.8	15.3	10-22.1	0	0-2.4	28	21-35.9	0	0-2.4	0	0-2.4
Spain	378	77.8	73.2-81.9	71.4	66.6-75.9	13.2	10-17.1	0.2	0-1.5	12.2	9-15.9	5.5	3.5-8.4	0.2	0-1.5
Sweden	301	13	9.4-17.3	2.7	1.2-5.2	0.7	0.1-2.4	0	0-1.2	10.3	7.1-14.3	0	0-1.2	0	0-1.2
United Kingdom	308	18.5	14.3-23.3	14.9	11.1-19.4	2.9	1.3-5.5	0.3	0-1.8	3.9	2-6.7	0.3	0-1.8	0	0-1.2
Total (28 MSs)	**6,792**	**42.7**	**41.5-43.9**	**34.1**	**33-35.3**	**8.6**	**7.9-9.3**	**0.3**	**0.2-0.5**	**9.7**	**9-10.5**	**1.2**	**0.9-1.4**	**0**	**0-0.1**
Iceland	134	12.7	7.6-19.5	1.5	0.2-5.3	0.7	0-4.1	0.7	0-4.1	11.9	7-18.7	0.7	0-4.1	0	0-2.7
Norway	287	18.8	14.5-23.8	1.7	0.6-4	0.4	0-1.9	0	0-1.3	17.1	12.9-21.9	0	0-1.3	0	0-1.3
Switzerland	306	13.1	9.5-17.4	8.8	5.9-12.6	2.6	1.1-5.1	0	0-1.2	4.6	2.5-7.6	0.3	0-1.8	0	0-1.2

ESBL: extended-spectrum β-lactamase; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; P: prevalence; CI: confidence interval; MSs: Member States; N_s: total number of samples tested.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for FOX and/or CAZ (screening breakpoint) were considered (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209).
(b): All isolates showing clavulanate synergy with CTX or CAZ or synergy with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).
(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.
(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.
(e): Isolates with microbiological resistance to FOX, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).
(f): Isolates showing synergy with CTX or CAZ and microbiological resistance to FOX, suggesting ESBL and AmpC enzymes in the same isolate. ESBL and AmpC columns include those isolates.
(g): Isolates with microbiological meropenem resistance.

Table 16: Occurrence of presumptive ESBL- and/or AmpC-producing *E. coli* isolates from fattening pigs collected within the specific ESBLs-/AmpC-/carbapenemase-producing monitoring and subjected to supplementary testing (panel 2) in 2019

Country	N_{p2}	ESBL and/or AmpC [a]		ESBL [b]		ESBL only CTX/CLA SYN [c]		ESBL only CAZ/CLA SYN [d]		AmpC [e]		AmpC + ESBL[f]		CPs [g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Austria	192	192	100	178	92.7	43	22.4	1	0.5	16	8.3	2	1	0	0
Belgium	144	137	95.1	113	78.5	48	33.3	5	3.5	26	18.1	2	1.4	0	0
Bulgaria	81	79	97.5	79	97.5	26	32.1	1	1.2	1	1.2	1	1.2	0	0
Croatia	84	84	100	66	78.6	29	34.5	1	1.2	19	22.6	1	1.2	0	0
Cyprus	3	3	100	3	100	0	0	0	0	0	0	0	0	0	0
Czechia	108	108	100	73	67.6	28	25.9	0	0	36	33.3	1	0.9	0	0
Denmark	89	88	98.9	24	27	12	13.5	0	0	64	71.9	0	0	0	0
Estonia	37	36	97.3	22	59.5	2	5.4	0	0	14	37.8	0	0	0	0
Finland	7	7	100	1	14.3	1	14.3	0	0	6	85.7	0	0	0	0
France	66	65	98.5	52	78.8	8	12.1	1	1.5	15	22.7	2	3	0	0
Germany	198	198	100	172	86.9	22	11.1	0	0	28	14.1	2	1	0	0
Greece	60	60	100	55	91.7	3	5	0	0	6	10	1	1.7	0	0
Hungary	195	195	100	182	93.3	47	24.1	1	0.5	19	9.7	6	3.1	0	0
Ireland	133	130	97.7	91	68.4	36	27.1	0	0	42	31.6	3	2.3	0	0
Italy	266	264	99.2	226	85	47	17.7	2	0.8	40	15	2	0.8	0	0
Latvia	83	82	98.8	76	91.6	19	22.9	0	0	6	7.2	0	0	0	0
Lithuania	37	37	100	31	83.8	6	16.2	0	0	6	16.2	0	0	0	0
Luxembourg	20	20	100	17	85	6	30	0	0	3	15	0	0	0	0
Malta	34	34	100	33	97.1	5	14.7	1	2.9	1	2.9	0	0	0	0
Netherlands	51	51	100	27	52.9	7	13.7	0	0	24	47.1	0	0	0	0
Poland	136	135	99.3	89	65.4	19	14	4	2.9	55	40.4	9	6.6	0	0
Portugal	167	167	100	155	92.8	23	13.8	0	0	31	18.6	19	11.4	0	0
Romania	168	168	100	119	70.8	36	21.4	0	0	54	32.1	5	3	0	0
Slovakia	80	78	97.5	61	76.3	26	32.5	1	1.3	18	22.5	1	1.3	0	0
Slovenia	92	91	98.9	49	53.3	23	25	0	0	42	45.7	0	0	0	0
Spain	295	294	99.7	270	91.5	50	16.9	1	0.3	46	15.6	21	7.1	1	0.3
Sweden	39	39	100	8	20.5	2	5.1	0	0	31	79.5	0	0	0	0
United Kingdom	58	57	98.3	46	79.3	9	15.5	1	1.7	12	20.7	1	1.7	0	0
Total (28 MSs)	**2,923**	**2,899**	**99.2**	**2,318**	**79.3**	**583**	**19.9**	**20**	**0.7**	**661**	**22.6**	**79**	**2.7**	**0**	**0**
Iceland	17	17	100	2	11.8	1	5.9	1	5.9	16	94.1	1	5.9	0	0
Norway	54	54	100	5	9.3	1	1.9	0	0	49	90.7	0	0	0	0
Switzerland	40	40	100	27	67.5	8	20	0	0	14	35	1	2.5	0	0

ESBL: extended-spectrum β-lactamase; n: isolates with this phenotype; %: percentage of isolates from the total tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States. N_{P2}: Total number of isolates tested with panel 2.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209).

(b): All isolates showing clavulanate synergy with cefotaxime, ceftazidime or with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).

(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.

(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.

(e): Isolates with microbiological resistance to cefoxitin, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).

(f): Isolates showing synergy with cefotaxime or ceftazidime and with microbiological resistance to cefoxitin, suggesting the presence of ESBL and AmpC enzymes in the same isolate. These isolates are also included in the ESBL and AmpC columns.

(g): Isolates with microbiological meropenem resistance.

(h): Percentage of the total number of *E. coli* isolates tested (with panel 2).

Table 17: Prevalence of presumptive ESBL- and/or AmpC-producing *E. coli* isolates from bovine meat (retail) collected within the specific ESBLs/AmpC/Carbapenemase-producing monitoring and subjected to supplementary testing (panel 2) in 2019

Country	N_s	ESBL and/or AmpC[a]		ESBL[b]		ESBL only CTX/CLA SYN[c]		ESBL only CAZ/CLA SYN[d]		AmpC[e]		AmpC + ESBL[f]		CPs[g]	
		%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI
Austria	340	1.2	0.3-3	1.2	0.3-3	0.9	0.2-2.6	0	0-1.1	0	0-1.1	0	0-1.1	0	0-1.1
Belgium	300	3.7	1.6-6	3.3	1.4-5.6	1.1	0.2-2.9	0	0-1.2	0.4	0-1.8	0	0-1.2	0	0-1.2
Bulgaria	150	24	17.4-31.6	23.3	16.8-30.9	6.7	3.2-11.9	0	0-2.4	0.7	0-3.7	0	0-2.4	0	0-2.4
Croatia	121	2.5	0.5-7.1	1.7	0.2-5.8	0.8	0-4.5	0	0-3	0.8	0-4.5	0	0-3	0	0-3
Cyprus	147	4.8	1.9-9.6	3.4	1.1-7.8	1.4	0.2-4.8	0	0-2.5	1.4	0.2-4.8	0	0-2.5	0	0-2.5
Czechia	298	9.7	6.6-13.7	8.1	5.2-11.7	3.4	1.6-6.1	0	0-1.2	1.7	0.5-3.9	0	0-1.2	0	0-1.2
Denmark	319	3.8	2-6.5	2.5	1.1-4.9	0.3	0-1.7	0	0-1.1	1.3	0.3-3.2	0	0-1.1	0	0-1.1
Estonia	150	2	0.4-5.7	2	0.4-5.7	0.7	0-3.7	0	0-2.4	0	0-2.4	0	0-2.4	0	0-2.4
Finland	297	0.7	0.1-2.4	0.7	0.1-2.4	0	0-1.2	0	0-1.2	0	0-1.2	0	0-1.2	0	0-1.2
France	317	0.6	0.1-2.3	0	0-1.2	0	0-1.2	0	0-1.2	0.6	0.1-2.3	0	0-1.2	0	0-1.2
Germany	471	3.4	1.8-5.2	3.2	1.6-4.9	0.7	0.1-1.9	0	0-0.8	0.2	0-1.2	0	0-0.8	0	0-0.8
Greece	131	7.6	3.7-13.6	6.9	3.2-12.6	0.8	0-4.2	0	0-2.8	0.8	0-4.2	0	0-2.8	0	0-2.8
Hungary	174	15.5	10.5-21.8	14.4	9.5-20.5	5.2	2.4-9.6	0	0-2.1	1.1	0.1-4.1	0	0-2.1	0	0-2.1
Ireland	300	0.7	0.1-2.4	0	0-1.2	0	0-1.2	0	0-1.2	0.7	0.1-2.4	0	0-1.2	0	0-1.2
Italy	152	10.5	6.1-16.5	9.9	5.6-15.8	3.9	1.5-8.4	0	0-2.4	0.7	0-3.6	0	0-2.4	0	0-2.4
Latvia	144	3.5	0.8-7	3.5	0.8-7	3.5	0.8-7	0	0-2.5	0	0-2.5	0	0-2.5	0	0-2.5
Lithuania	150	8	4.2-13.6	6.7	3.2-11.9	0.7	0-3.7	0	0-2.4	1.3	0.2-4.7	0	0-2.4	0	0-2.4
Luxembourg	22	13.6	2.9-34.9	13.6	2.9-34.9	9.1	1.1-29.2	0	0-15.4	4.5	0.1-22.8	4.5	0.1-22.8	0	0-15.4
Malta	70	8.6	3.2-17.7	8.6	3.2-17.7	0	0-5.1	0	0-5.1	2.9	0.3-9.9	2.9	0.3-9.9	0	0-5.1
Netherlands	495	1.2	0.3-2.3	0.7	0.1-1.8	0.2	0-1.1	0	0-0.7	0.5	0-1.5	0	0-0.7	0	0-0.7
Poland	306	5.9	3.5-9.1	3.9	2-6.7	0.3	0-1.8	0	0-1.2	2.3	0.9-4.7	0.3	0-1.8	0	0-1.2
Portugal	120	18.3	11.9-26.4	18.3	11.9-26.4	3.3	0.9-8.3	0	0-3	0.8	0-4.6	0.8	0-4.6	0	0-3
Romania	150	4	1.5-8.5	2.7	0.7-6.7	0.7	0-3.7	0	0-2.4	1.3	0.2-4.7	0	0-2.4	0	0-2.4
Slovakia	150	6.7	3.2-11.9	6.7	3.2-11.9	2.7	0.7-6.7	0	0-2.4	0	0-2.4	0	0-2.4	0	0-2.4
Slovenia	151	4.6	1.9-9.3	4.6	1.9-9.3	3.3	1.1-7.6	0	0-2.4	0	0-2.4	0	0-2.4	0	0-2.4
Spain	300	15.3	3.3-19.9	15.3	3.3-19.9	2.7	0.2-2.9	0	0-1.2	0.9	0-1.8	0.9	0-1.8	0	0-1.2
Sweden	294	1	0.2-3	0.3	0-1.9	0	0-1.2	0	0-1.2	0.7	0.1-2.4	0	0-1.2	0	0-1.2
United Kingdom	289	0.3	0-1.9	0.3	0-1.9	0.3	0-1.9	0	0-1.3	0	0-1.3	0	0-1.3	0	0-1.3
Total (28 MSs)	**6,308**	**5.2**	**4.1-5.2**	**4.5**	**3.6-4.6**	**1.4**	**1-1.5**	**0**	**0-0.1**	**0.8**	**0.5-0.9**	**0.1**	**0-0.2**	**0**	**0-0.1**
Iceland	139	0.7	0-3.9	0.7	0-3.9	0	0-2.6	0	0-2.6	0	0-2.6	0	0-2.6	0	0-2.6
Norway	349	0.9	0.2-2.5	0.9	0.2-2.5	0.6	0.1-2.1	0	0-1.1	0	0-1.1	0	0-1.1	0	0-1.1
Rep. of North Macedonia	10	0	0-30.8	0	0-30.8	0	0-30.8	0	0-30.8	0	0-30.8	0	0-30.8	10	0.3-44.5
Switzerland	309	0.3	0-1.8	0	0-1.2	0	0-1.2	0	0-1.2	0.3	0-1.8	0	0-1.2	0	0-1.2

ESBL: extended-spectrum β-lactamase; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; P: prevalence; CI: confidence interval; N_s: total number of samples.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing MIC > 1 mg/L for CTX and/or CAZ (screening breakpoint) were considered (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209).

(b): All isolates showing clavulanate synergy with CTX or CAZ or synergy with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).

(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.

(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.

(e): Isolates with microbiological resistance to FOX, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).

(f): Isolates showing synergy with FOX or CAZ and microbiological resistance to FOX, suggesting ESBL and AmpC enzymes in the same isolate. ESBL and AmpC columns include those isolates.

(g): Isolates with microbiological MEM resistance.

Table 18: Occurrence of presumptive ESBL- and/or AmpC-producing *E. coli* isolates from bovine meat (retail) collected within the specific ESBLs/AmpC/Carbapenemase-producing monitoring and subjected to supplementary testing (panel 2) in 2019

Country	N_{p2}	ESBL and/or AmpC [a]		ESBL [b]		ESBL only CTX/CLA SYN [c]		ESBL only CAZ/CLA SYN [d]		AmpC [e]		AmpC + ESBL [f]		CPs [g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Austria	4	4	100	4	100	3	75	0	0	0	0	0	0	0	0
Belgium	10	10	100	9	90	3	30	0	0	1	10	0	0	0	0
Bulgaria	36	36	100	35	97.2	10	27.8	0	0	1	2.8	0	0	0	0
Croatia	3	3	100	2	66.7	1	33.3	0	0	1	33.3	0	0	0	0
Cyprus	7	7	100	5	71.4	2	28.6	0	0	2	28.6	0	0	0	0
Czechia	29	29	100	24	82.8	10	34.5	0	0	5	17.2	0	0	0	0
Denmark	12	12	100	8	66.7	1	8.3	0	0	4	33.3	0	0	0	0
Estonia	3	3	100	3	100	1	33.3	0	0	0	0	0	0	0	0
Finland	2	2	100	2	100	0	0	0	0	0	0	0	0	0	0
France	2	2	100	0	0	0	0	0	0	2	100	0	0	0	0
Germany	15	15	100	14	93.3	3	20	0	0	1	6.7	0	0	0	0
Greece	10	10	100	9	90	1	10	0	0	1	10	0	0	0	0
Hungary	27	27	100	25	92.6	9	33.3	0	0	2	7.4	0	0	0	0
Ireland	2	2	100	0	0	0	0	0	0	2	100	0	0	0	0
Italy	16	16	100	15	93.8	6	37.5	0	0	1	6.3	0	0	0	0
Latvia	4	4	100	4	100	4	100	0	0	0	0	0	0	0	0
Lithuania	12	12	100	10	83.3	1	8.3	0	0	2	16.7	0	0	0	0
Luxembourg	3	3	100	3	100	2	66.7	0	0	1	33.3	1	33.3	0	0
Malta	6	6	100	6	100	0	0	0	0	2	33.3	2	33.3	0	0
Netherlands	5	5	100	3	60	1	20	0	0	2	40	0	0	0	0
Poland	18	18	100	12	66.7	1	5.6	0	0	7	38.9	1	5.6	0	0
Portugal	22	22	100	22	100	4	18.2	0	0	1	4.5	1	4.5	0	0
Romania	6	6	100	4	66.7	1	16.7	0	0	2	33.3	0	0	0	0
Slovakia	10	10	100	10	100	4	40	0	0	0	0	0	0	0	0
Slovenia	7	7	100	7	100	5	71.4	0	0	0	0	0	0	0	0
Spain	17	17	100	17	100	3	17.6	0	0	1	5.9	1	5.9	0	0
Sweden	3	3	100	1	33.3	0	0	0	0	2	66.7	0	0	0	0
United Kingdom	1	1	100	1	100	1	100	0	0	0	0	0	0	0	0
Total (28 MSs)	**292**	**292**	**100**	**255**	**87.3**	**77**	**26.4**	**0**	**0**	**43**	**14.7**	**6**	**2.1**	**0**	**0**
Iceland	1	1	100	1	100	0	0	0	0	0	0	0	0	0	0
Norway	3	3	100	3	100	2	66.7	0	0	0	0	0	0	0	0
Rep. of North Macedonia	1	0	0	0	0	0	0	0	0	0	0	0	0	1	100

Switzerland	1	1	100	0	0	0	0	0	0	1	100	0	0	0	0

ESBL: extended-spectrum β-lactamase; n = isolates with this phenotype; %: percentage of isolates from the total tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States. N_{P2}: Total number of isolates tested with panel 2.

(a): Several countries reported only a few isolates. For countries reporting less than 10 isolates, occurrence data should be carefully considered.
(b): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were considered (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209).
(c): All isolates showing clavulanate synergy with cefotaxime, ceftazidime or with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).
(d): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.
(e): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.
(f): Isolates with microbiological resistance to cefoxitin, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).
(g): Isolates showing synergy with cefotaxime or ceftazidime and with microbiological resistance to cefoxitin, suggesting the presence of ESBL and AmpC enzymes in the same isolate. These isolates are also included in the ESBL and AmpC columns.
(h): Percentage of the total number of *E. coli* isolates tested (with panel 2).

Table 19: Prevalence of presumptive ESBL- and/or AmpC-producing *E. coli* isolates from cattle under 1 year of age collected within the specific ESBLs/AmpC/Carbapenemase-producing monitoring and subjected to supplementary testing (panel 2) in 2019

Country	N_s	ESBL and/or AmpC[a]		ESBL[b]		ESBL only CTX/CLA SYN[c]		ESBL only CAZ/CLA SYN[d]		AmpC[e]		AmpC + ESBL[f]		CPs[g]	
		%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI
Belgium	300	62.5	49.5-68.2	58.8	46.2-64.3	9.8	5.7-12.4	1.2	0.2-2.9	6	3.1-8.5	2.2	0.7-4.3	0	0-1.2
Croatia	170	23.5	17.4-30.6	15.3	10.2-21.6	4.7	2.1-9.1	0	0-2.1	8.2	4.6-13.4	0	0-2.1	0	0-2.1
Denmark	306	7.8	5.1-11.4	4.2	2.3-7.2	2	0.7-4.2	0	0-1.2	3.9	2-6.7	0.3	0-1.8	0	0-1.2
France	244	20.1	15.2-25.7	12.7	8.8-17.5	2.5	0.9-5.3	0	0-1.5	8.6	5.4-12.9	1.2	0.3-3.6	0	0-1.5
Germany	407	70.8	62.8-72.1	69.2	61.3-70.7	8.2	5.4-10.9	0	0-0.9	3.3	1.7-5.4	1.8	0.7-3.5	0	0-0.9
Italy	268	99.6	97.9-100	98.5	96.2-99.6	23.1	18.2-28.7	0.4	0-2.1	2.2	0.8-4.8	1.1	0.2-3.2	0	0-1.4
Netherlands	297	32.3	29.3-40.4	30.1	27-38	3.1	1.6-6.1	0	0-1.2	4.1	2.4-7.4	1.9	0.7-4.3	0	0-1.2
Portugal	298	45.3	36.6-48.1	44.6	36-47.4	2.9	1.2-5.2	0	0-1.2	2.2	0.7-4.3	1.4	0.4-3.4	0	0-1.2
Spain	398	38.9	34.1-43.9	36.2	31.5-41.1	9.8	7.1-13.2	0	0-0.9	4.8	2.9-7.4	2	0.9-3.9	0	0-0.9
Total (9 MSs)	**2,688**	**46.2**	**42.9-46.7**	**43**	**39.9-43.7**	**7.5**	**6.4-8.4**	**0.1**	**0-0.4**	**4.6**	**3.7-5.3**	**1.4**	**1-1.9**	**0**	**0-0.1**
Norway	319	4.1	2.2-6.9	1.3	0.3-3.2	0	0-1.1	0	0-1.1	2.8	1.3-5.3	0	0-1.1	0	0-1.1
Switzerland	298	30.6	25.4-36.1	21.1	16.6-26.2	5	2.8-8.2	0	0-1.2	10.1	6.9-14.1	0.7	0.1-2.4	0	0-1.2

ESBL: extended-spectrum β-lactamase; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; P: prevalence; CI: confidence interval; MSs: Member States; Ns: total number of samples.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing MIC > 1 mg/L for CTX and/or CAZ (screening breakpoint) were considered (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209).
(b): All isolates showing clavulanate synergy with CTX or CAZ or synergy with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).
(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.
(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.
(e): Isolates with microbiological resistance to cefoxitin, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).
(f): Isolates showing synergy with CTX or CAZ and microbiological resistance to FOX, suggesting ESBL and AmpC enzymes in the same isolate. ESBL and AmpC columns include those isolates.
(g): Isolates with microbiological meropenem resistance.

Table 20: Occurrence of presumptive ESBL- and/or AmpC-producing *E. coli* isolates from cattle under 1 year of age collected within the specific ESBLs/AmpC/Carbapenemase-producing monitoring and subjected to supplementary testing (panel 2) in 2019

Country	N_{p2}	ESBL and/or AmpC (a)		ESBL (b)		ESBL only CTX/CLA SYN (c)		ESBL only CAZ/CLA SYN (d)		AmpC (e)		AmpC + ESBL (f)		CPs	
		n	%(h)	n	%(h)	n	%(h)	n	%(h)	n	%(h)	n	%(h)	n	%(h)
Belgium	170	166	97.6	156	91.8	26	15.3	3	1.8	16	9.4	6	3.5	0	0
Croatia	40	40	100	26	65	8	20	0	0	14	35	0	0	0	0
Denmark	25	24	96	13	52	6	24	0	0	12	48	1	4	0	0
France	51	49	96.1	31	60.8	6	11.8	0	0	21	41.2	3	5.9	0	0
Germany	275	275	100	269	97.8	32	11.6	0	0	13	4.7	7	2.5	0	0
Italy	268	267	99.6	264	98.5	62	23.1	1	0.4	6	2.2	3	1.1	0	0
Netherlands	103	103	100	96	93.2	10	9.7	0	0	13	12.6	6	5.8	0	0
Portugal	126	126	100	124	98.4	8	6.3	0	0	6	4.8	4	3.2	0	0
Spain	157	155	98.7	144	91.7	39	24.8	0	0	19	12.1	8	5.1	0	0
Total (9 MSs)	**1,215**	**1,205**	**99.2**	**1,123**	**92.4**	**197**	**16.2**	**4**	**0.3**	**120**	**9.9**	**38**	**3.1**	**0**	**0**
Norway	14	13	92.9	4	28.6	0	0	0	0	9	64.3	0	0	0	0
Switzerland	98	91	92.9	63	64.3	15	15.3	0	0	30	30.6	2	2	0	0

ESBL: extended-spectrum β-lactamase; n = isolates with this phenotype; %: percentage of isolates from the total tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate. MSs: Member States. N_{P2}: Total number of isolates tested with panel 2.

(a): According to EUCAST Guidelines (EUCAST, 2019), only isolates showing an MIC > 1 mg/L for cefotaxime and/or ceftazidime (screening breakpoint) were considered (see Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209).

(b): All isolates showing clavulanate synergy with cefotaxime, ceftazidime or with both compounds, suggesting the presence of an ESBL (independently of the presence of other mechanisms).

(c): Isolates showing synergy with cefotaxime only, suggesting the presence of an ESBL with cefotaximase activity.

(d): Isolates showing synergy with ceftazidime only, suggesting the presence of an ESBL with ceftazidimase activity.

(e): Isolates with microbiological resistance to cefoxitin, suggesting the presence of an AmpC enzyme (independently of the presence of other mechanisms).

(f): Isolates showing synergy with cefotaxime or ceftazidime and with microbiological resistance to cefoxitin, suggesting the presence of ESBL and AmpC enzymes in the same isolate. These isolates are also included in the ESBL and AmpC columns.

(g): Isolates with microbiological meropenem resistance.

(h): Percentage of the total number of *Salmonella* spp. isolates tested (with panel 2).

D.4. Specific carbapenemase-producing *E. coli* monitoring 2019-2020

This monitoring programme was performed and reported on a voluntary basis. For the specific monitoring of carbapenemase-producing microorganisms, isolation required the use of non-selective pre-enrichment and subsequent selective plating on carbapenem-containing media, in accordance with the most recent version of the detailed protocol of the EURL-AR.[3] More information is provided in Appendix F. Materials and Methods available at https://doi.org/10.2903/j.efsa.2022.7209).

Table 21: Number of samples investigated and number of presumptive carbapenemase-producing *E. coli* in the voluntary specific carbapenemase-producing monitoring in 2019-2020

	Animal population / Meat													
	Pig Meat 2019		Fattening Pigs 2019		Bovine Meat 2019		Cattle, < 1 year old 2019		Broiler Meat 2020		Broilers 2020		Fattening Turkeys 2020	
Reporting country	N_s	n_{CP}	N_s	n_{CP}	N_s	n_{CP}	N_s	n_{CP}	N_s	n_{CP}	N_s	n_{CP}	N_s	n_{CP}
Austria	313	0	313	0	2	0	–	–	288	0	–	–	275	0
Belgium	300	0	297	0	300	0	300	0	250	0	406	0	–	–
Bulgaria	150	0	153	0	150	0	–	–	–	–	–	–	–	–
Croatia	126	0	393	0	121	0	170	0	127	0	175	0	–	–
Czechia	1	0	319	0	5	0	–	–	299	0	300	0	–	–
Denmark	317	0	329	0	2	0	306	0	337	0	308	0	–	–
Estonia	4	0	74	0	2	0	–	–	75	0	85	0	–	–
Finland	306	0	288	0	297	0	–	–	296	0	309	0	–	–
France	322	0	299	0	317	0	244	0	316	0	342	0	295	0
Germany	501	1	–	–	–	–	–	–	442	0	419	0	434	0
Greece	1	0	153	0	1	0	–	–	222	0	312	0	–	–
Hungary	279	0	295	0	175	0	–	–	300	0	300	0	300	0
Ireland	300	0	300	0	300	0	–	–	300	0	300	0	–	–
Italy	–	–	266	1	–	–	–	–	–	–	–	–	–	–
Malta	–	–	51	0	–	–	–	–	–	–	–	–	–	–
Poland	305	0	308	0	306	0	–	–	315	0	306	0	307	0
Portugal	116	0	152	0	109	0	141	0	114	0	246	0	164	0
Romania	–	–	222	1	–	–	–	–	–	–	?	3	–	–
Slovakia	2	0	150	0	1	–	–	–	150	0	150	0	–	–
Slovenia	27	0	151	0	151	0	–	–	152	0	153	0	–	–
Spain													?	1
Sweden	12	0	300	0	4	0	–	–	306	0	300	0	45	0

[3] https://www.eurl-ar.eu/protocols.aspx

United Kingdom	285	0	308	0	289	0	–	–	315	0	350	0	334	0
Total (21 MSs+UK)	**3,667**	1	**5,121**	2	**2,532**	0	**1,161**	0	**4,604**	0	**4,761**	0	**2,154**	0
Norway	352	0	286	0	349	0	319	0	314	0	224	0	106	0
Switzerland	1	0	306	0	7	0	298	0	296	0	612	0	–	–

N_s: number of fresh meat samples collected at retail. n_{CP}: number of positive isolates. For 2018 and 2019, the Netherlands also reported data on additional specific monitoring of carbapenemase-producing *E. coli* in broilers, fattening pigs and bovines under 1 year using a different isolation protocol (EFSA and ECDC, 2019). All these samples (n=1,814) were negative. In addition, for 2019, using samples collected on farms (not at the slaughterhouse) Germany detected two additional suspected carbapenemase-producing *E. coli* from fattening pigs that were reported under OTHER CARBA MON.

D.5. Key outcome indicator of prevalence of ESBL- and/or AmpC-producing *E. coli*, food-producing animals, 2015-2020

Table 22: Changes in key outcome indicator of ESBL- and/or AmpC- producing indicator *E. coli* (OI_{ESC}), 2015-2020

Country	Period[(a)]				
	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Austria	52.1	59.9	56.4	56.2	52.8
Belgium	65.8	71.9	68.2	55.6	56.0
Bulgaria	64.4	55.3	51.9	55.7	52.2
Croatia	38.9	46.8	48.1	60.6	58.7
Cyprus	24.6	22.1	9.4	8.5	7.5
Czechia	40.5	42.1	37.6	38.0	34.7
Denmark	27.3	24.0	23.9	26.0	25.2
Estonia	36.7	35.3	38.2	50.5	48.7
Finland	6.3	6.3	6.2	6.1	1.6
France	39.6	32.8	26.6	22.1	16.8
Germany	47.2	47.5	47.0	50.1	48.0
Greece	54.4	59.1	42.5	42.5	47.4
Hungary	60.6	67.5	65.8	63.4	53.7
Ireland	42.3	47.6	40.1	45.6	36.1
Italy	-	88.7	82.3	88.9	75.0
Latvia	62.4	60.6	43.6	48.8	51.0
Lithuania	49.7	67.9	69.3	55.8	51.8
Luxembourg	58.9	40.9	40.7	52.3	52.2
Malta	-	-	45.7	66.9	67.2
Netherlands	23.7	23.9	19.1	19.5	17.2
Poland	44.7	51.1	44.5	41.9	34.0
Portugal	61.3	56.5	71.4	77.6	65.4
Romania	60.8	65.6	66.0	69.4	66.4
Slovakia	62.1	66.7	35.0	38.9	72.2
Slovenia	71.6	79.0	72.2	75.6	67.5
Spain	86.4	85.7	85.7	79.0	73.1
Sweden	20.7	22.0	12.3	13.2	12.1
United Kingdom	27.1	24.8	14.3	13.3	10.0
Total (25 MSs+UK)	**49.2**	**49.9**	**46.8**	**45.2**	**41.3**
Iceland	-	5.3	4.0	6.4	6.6
Norway	10.9	12.8	9.5	12.7	12.4
Switzerland	30.3	25.1	21.1	19.6	14.4
Total (MSs and non-MSs)	**48.7**	**49.3**	**46.2**	**44.7**	**40.8**

(a): Proportions (in percent) of samples from broilers. fattening turkeys. fattening pigs and bovines under 1 year. weighted by PCU. that are identified as positive for presumptive ESBL- and/or AmpC-producing indicator *E. coli* in the framework of the specific monitoring for ESBL-/AmpC-/carbapenemase-producing indicator *E. coli* according to Commission Implementing Decision 2013/652/EU.