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), 2024. The European Union Summary Report on Antimicrobial Resistance in zoonotic and indicator bacteria from humans, animals and food in 2021/2022. EFSA Journal. 2024;22:e8583. https://doi.org/10.2903/j.efsa.2024.8583

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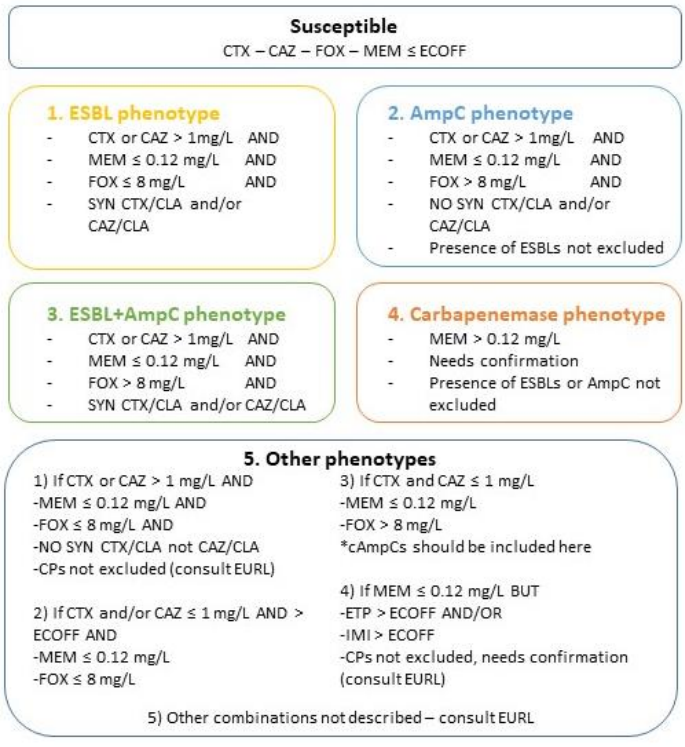
D.1. ESBL-, AmpC-, ESBL + AmpC- and CP-phenotypes

According to Commission Implementing Decision (EU) 2020/1729, reporting countries (RCs) determined the susceptibility of *Salmonella* spp. and indicator commensal *E. coli* to selected antimicrobials belonging to different classes (Panel 1). *Salmonella* spp. and indicator *E. coli* isolates that were found to be resistant to cefotaxime, ceftazidime or meropenem after testing with Panel 1, were further tested with a second panel of different beta-lactams including extended-spectrum cephalosporins and carbapenems (Panel 2). This was done to phenotypically identify presumptive ESBL-, AmpC-, and/or CP-producers. All isolates identified in the specific monitoring of ESBL-/AmpC-/CP-producing *E. coli* and the specific monitoring for CP-producing *E. coli* were tested using both Panel 1 and Panel 2. Since 2021, whole genome sequencing (WGS) has been authorised as an alternative method for phenotypic testing of *Salmonella* spp. and *E. coli* isolates displaying resistance to extended-spectrum cephalosporins or carbapenems. More information is provided in Appendix F – Materials and Methods.

For this report, the categorisation of isolates resistant to extended-spectrum cephalosporins and/or carbapenems in presumptive ESBL-, AmpC- or CP-producers was done based on the EUCAST guidelines for detection of resistance mechanisms and specific resistances of clinical and/or epidemiological importance (EUCAST, 2017) and the knowledge of consulted experts. Five main categorizations of phenotypes are made; 1. ESBL; 2. AmpC; 3. ESBL+AmpC; 4. CP and 5. Other (**Figure 1**).



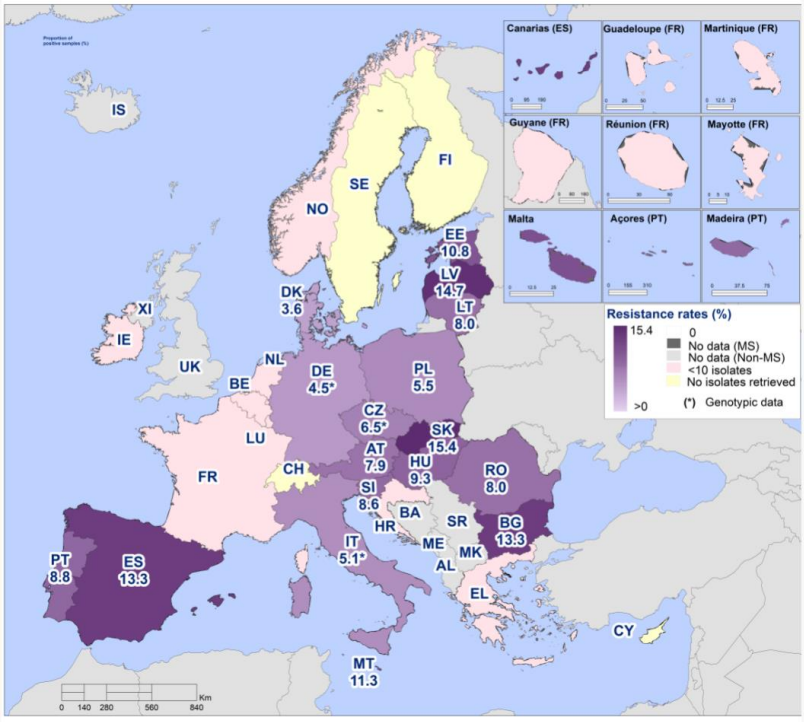
Presumptive ESBL producers include isolates exhibiting phenotype 1 or 3.
Presumptive AmpC-producers include isolates exhibiting phenotype 2 or 3.

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

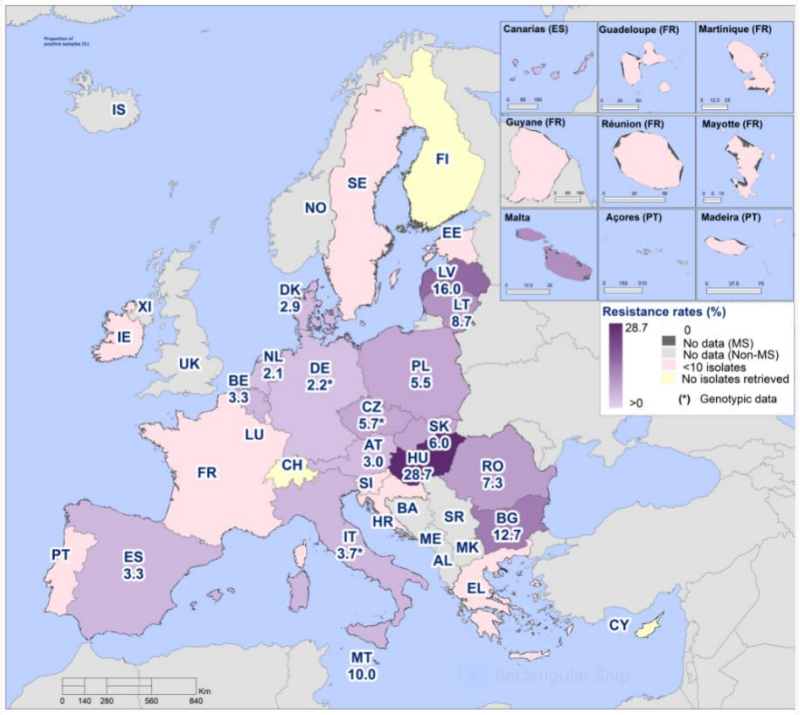
D.2. ESBL-, AmpC-producers prevalence maps

Marked variations in the prevalence of presumptive ESBL- and/or AmpC-producing *E. coli* in samples from food-producing animals and derived meat are demonstrated among MSs (Chapter 5). These variations are also evident when assessing the occurrence of isolates with ESBL or AmpC phenotypes separately (**Figure 2**, **Figure 3**, **Figure 4** and **Figure 5**).

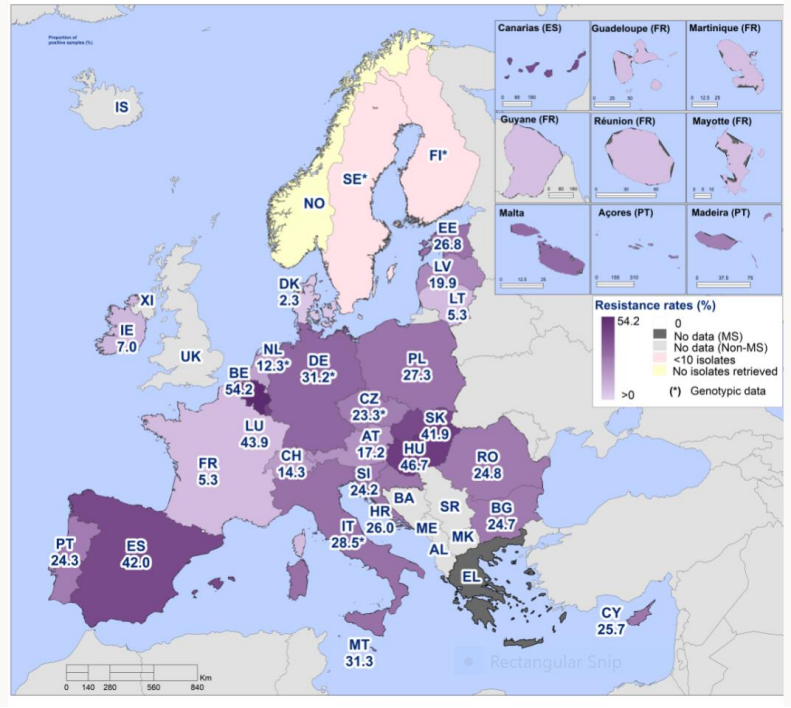
(a)



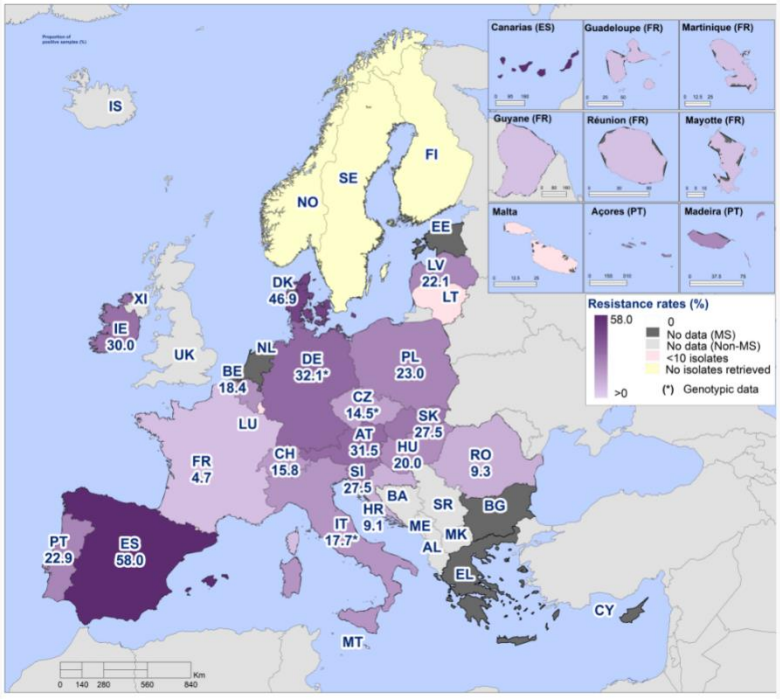
(b)



(c)



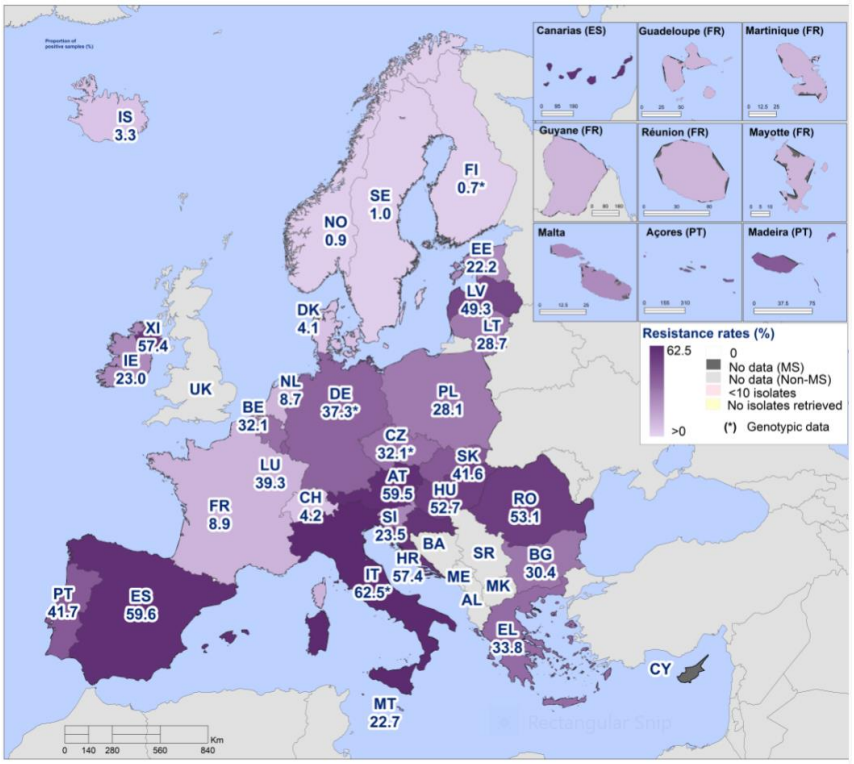
(d)



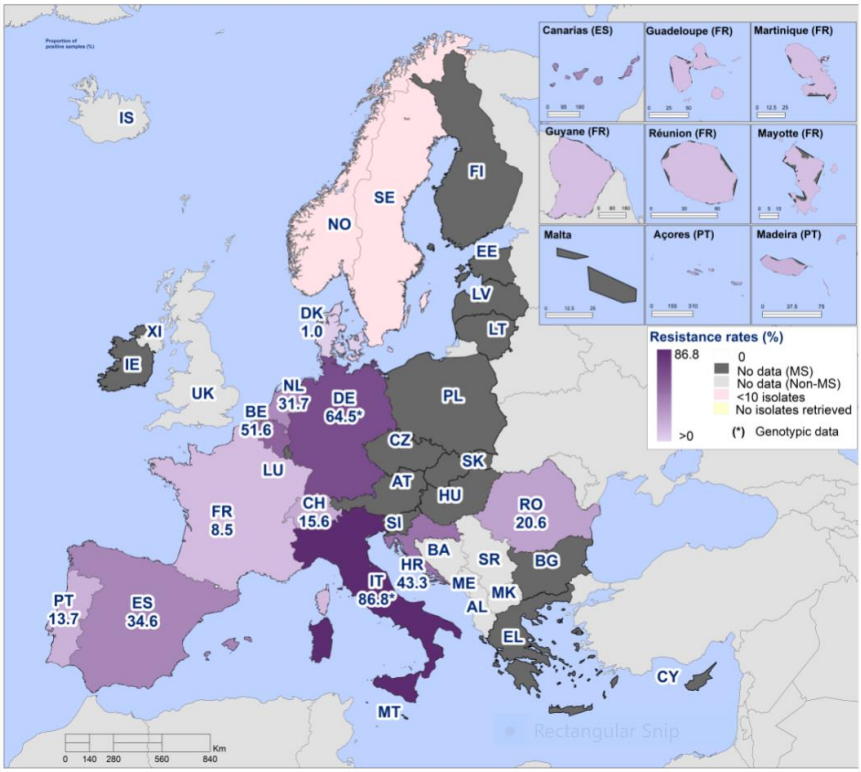
Countries displayed in grey colour (No data) include countries collecting samples without reporting any positive findings (0% prevalence) and countries not reporting any data.

Figure 2: Spatial distribution of the prevalence of presumptive ESBL-producing *Escherichia coli* from (a) pig meat in 2021, (b) cattle meat in 2021, (c) broiler meat in 2022 and (d) turkey meat in 2022, EU MSs and non-MSs, 2021-2022.

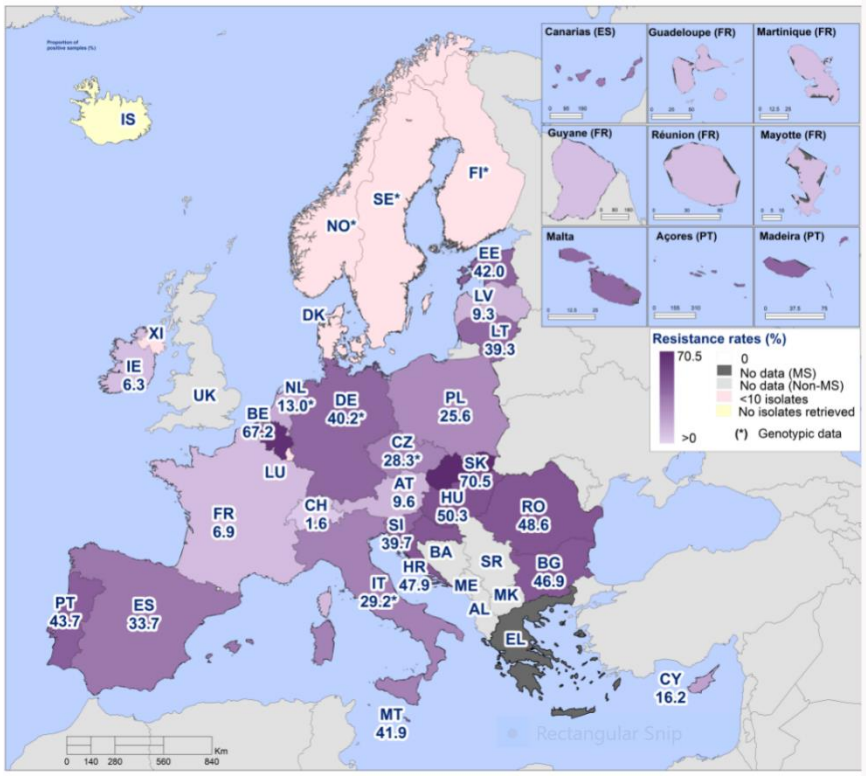
(a)


Canarias (ES)
Guadeloupe (FR)
Martinique (FR)
Guyane (FR)
Réunion (FR)
Mayotte (FR)
Malta
Açores (PT)
Madeira (PT)
Resistance rates (%)
62.5
0
No data (MS)
No data (Non-MS)
<10 isolates
No isolates retrieved
>0
(*) Genotypic data
IS 3.3
FI 0.7*
SE 1.0
NO 0.9
EE 22.2
LV 49.3
LT 28.7
DK 4.1
XI 57.4
IE 23.0
UK
NL 8.7
DE 37.3*
PL 28.1
BE 32.1
CZ 32.1*
SK 41.6
LU 39.3
AT 59.5
HU 52.7
RO 53.1
FR 8.9
CH 4.2
SI 23.5
BA
HR 57.4
SR
BG 30.4
IT 62.5*
ME
MK
AL
PT 41.7
ES 59.6
EL 33.8
CY
MT 22.7
0 140 280 560 840 Km

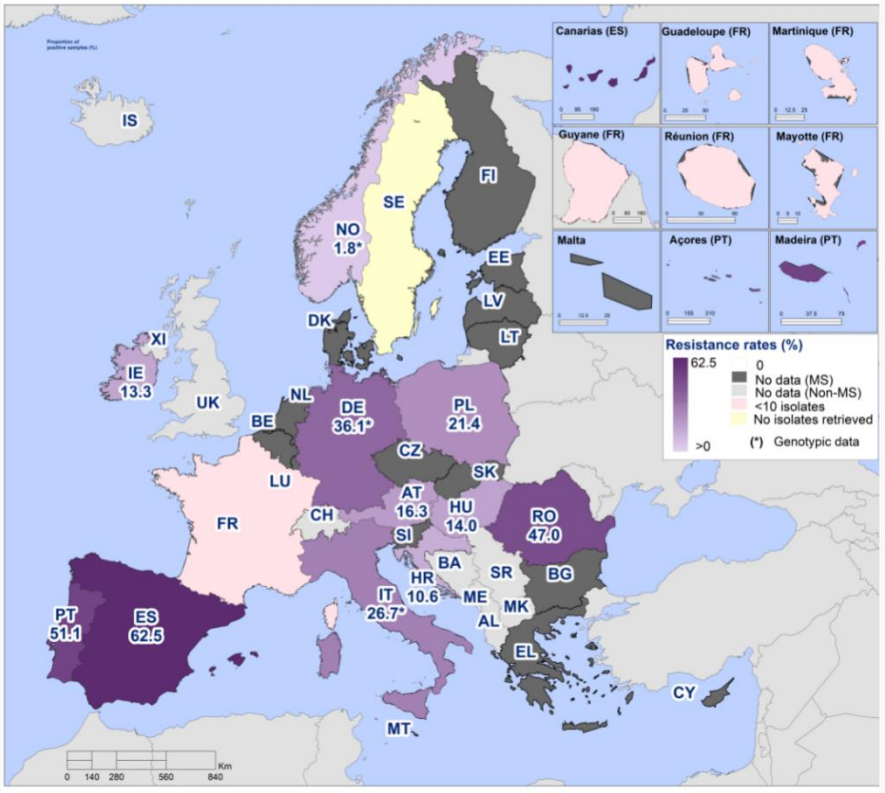
(b)


Canarias (ES)
Guadeloupe (FR)
Martinique (FR)
Guyane (FR)
Réunion (FR)
Mayotte (FR)
Malta
Açores (PT)
Madeira (PT)
Resistance rates (%)
86.8
0
No data (MS)
No data (Non-MS)
<10 isolates
No isolates retrieved
>0
(*) Genotypic data
IS
FI
SE
NO
EE
LV
LT
DK 1.0
XI
IE
UK
NL 31.7
DE 64.5*
PL
BE 51.6
CZ
SK
LU
AT
HU
RO 20.6
FR 8.5
CH 15.6
SI
BA
HR 43.3
SR
BG
IT 86.8*
ME
MK
AL
PT 13.7
ES 34.6
EL
CY
MT
0 140 280 560 840 Km

(c)



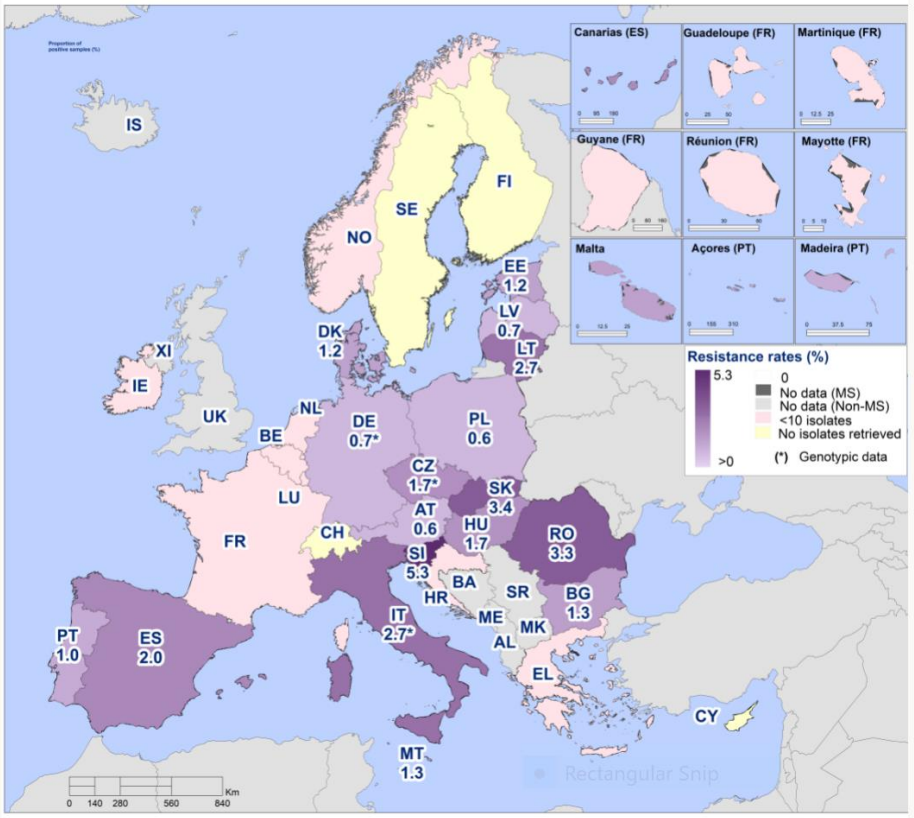
(d)



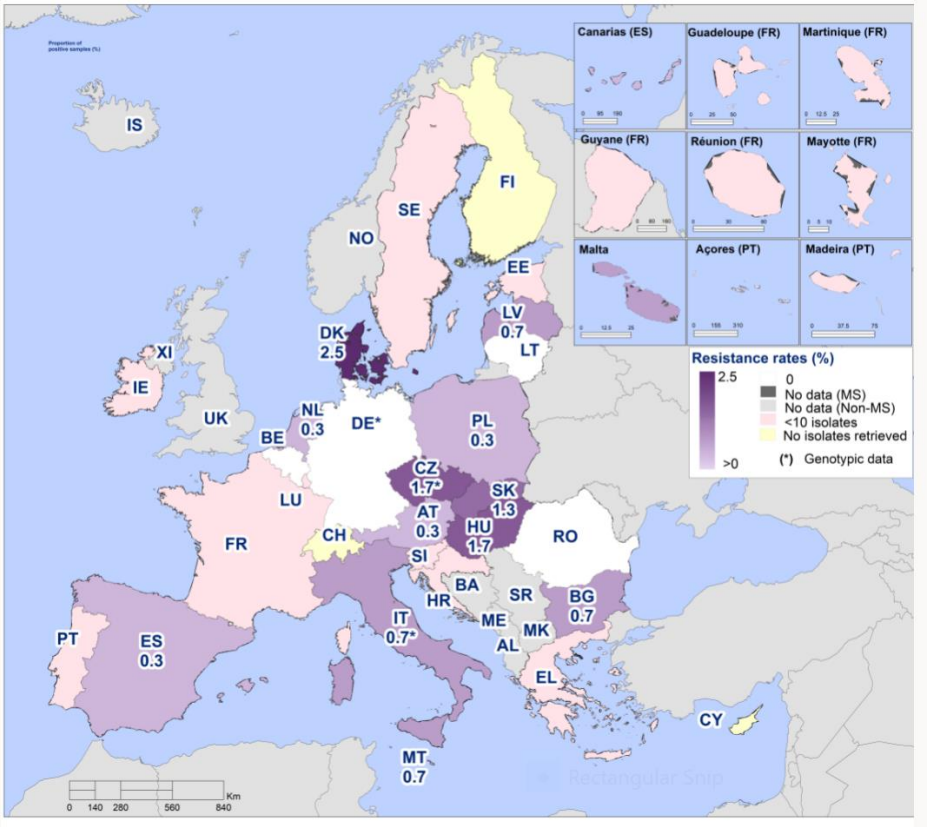
Countries displayed in grey colour (No data) include countries collecting samples without reporting any positive findings (0% prevalence) and countries not reporting any data.

Figure 3: Spatial distribution of the prevalence of presumptive ESBL-producing *Escherichia coli* from (a) fattening pigs in 2021, (b) cattle under one year of age in 2021, (c) broilers in 2022 and (d) fattening turkeys in 2022, EU MSs and non-MSs, 2021-2022.

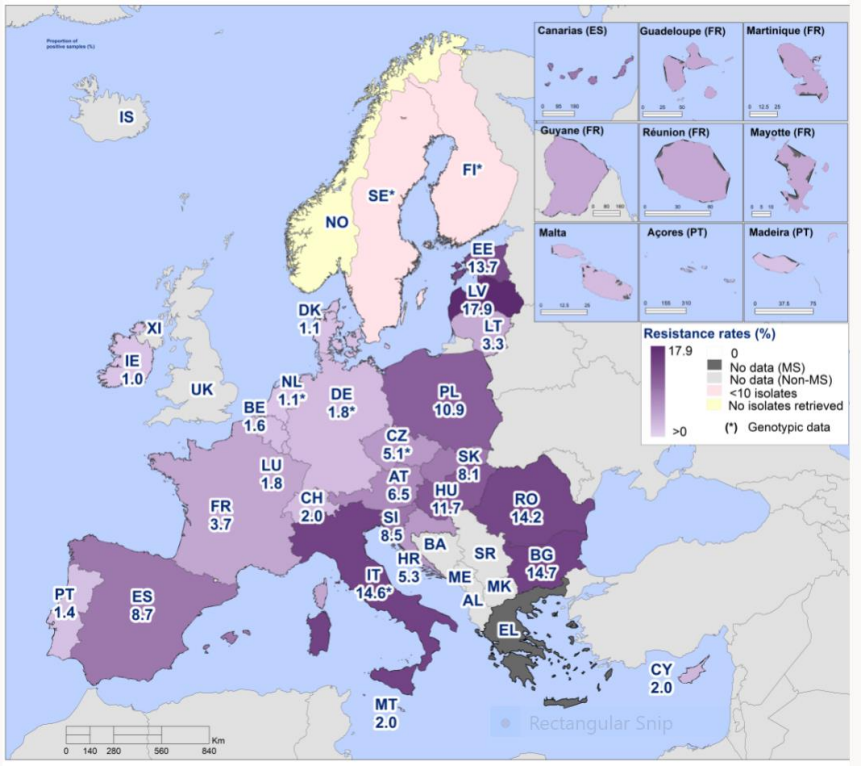
(a)


Canarias (ES)
Guadeloupe (FR)
Martinique (FR)
Guyane (FR)
Réunion (FR)
Mayotte (FR)
Malta
Açores (PT)
Madeira (PT)
Resistance rates (%)
5.3
0
No data (MS)
No data (Non-MS)
<10 isolates
No isolates retrieved
>0
(*) Genotypic data
IS
FI
SE
NO
EE 1.2
LV 0.7
LT 2.7
DK 1.2
XI
IE
UK
NL
BE
DE 0.7*
PL 0.6
CZ 1.7*
SK 3.4
AT 0.6
HU 1.7
LU
FR
CH
RO 3.3
SI 5.3
BA
HR
SR
BG 1.3
ME
MK
AL
IT 2.7*
PT 1.0
ES 2.0
EL
CY
MT 1.3
0 140 280 560 840 Km

(b)


Canarias (ES)
Guadeloupe (FR)
Martinique (FR)
Guyane (FR)
Réunion (FR)
Mayotte (FR)
Malta
Açores (PT)
Madeira (PT)
Resistance rates (%)
2.5
0
No data (MS)
No data (Non-MS)
<10 isolates
No isolates retrieved
>0
(*) Genotypic data
IS
FI
SE
NO
EE
LV 0.7
LT
DK 2.5
XI
IE
UK
NL 0.3
DE*
BE
PL 0.3
CZ 1.7*
SK 1.3
AT 0.3
HU 1.7
LU
FR
CH
RO
SI
BA
HR
SR
BG 0.7
ME
MK
AL
IT 0.7*
PT
ES 0.3
EL
CY
MT 0.7
0 140 280 560 840 Km

(c)



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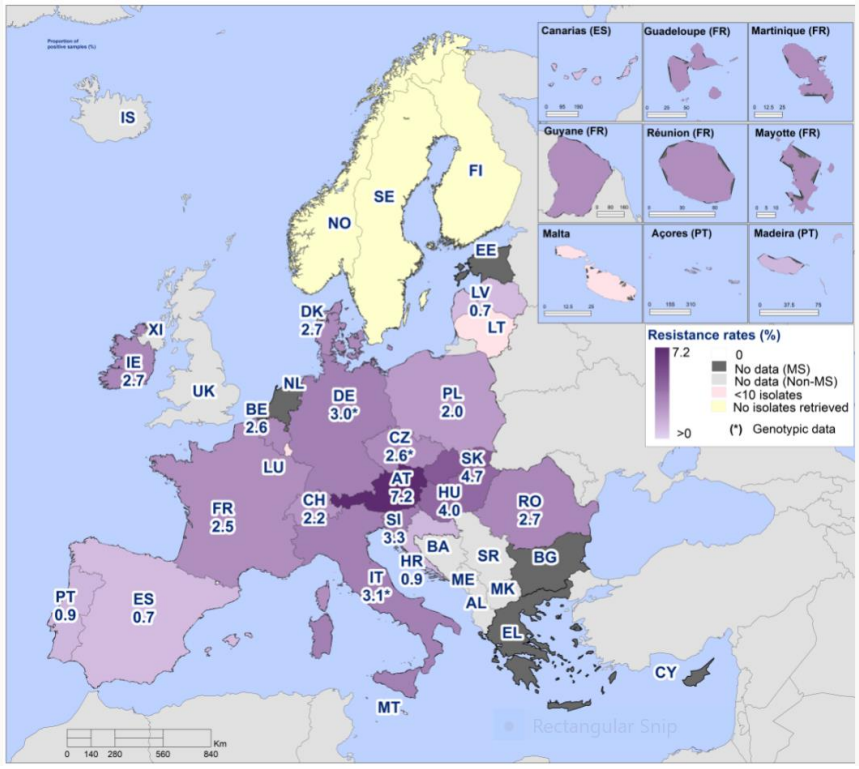
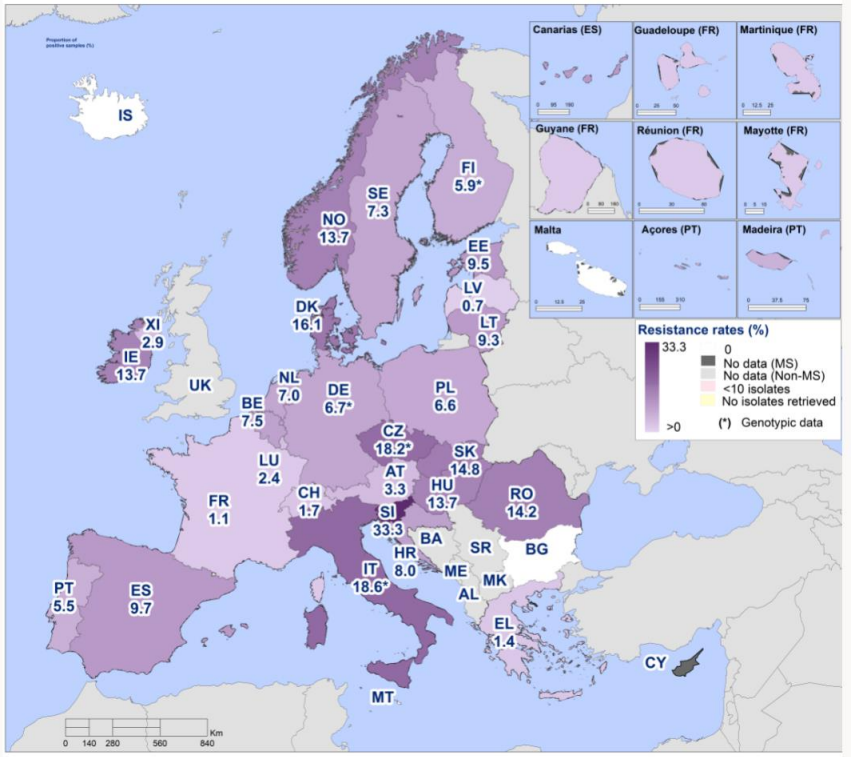


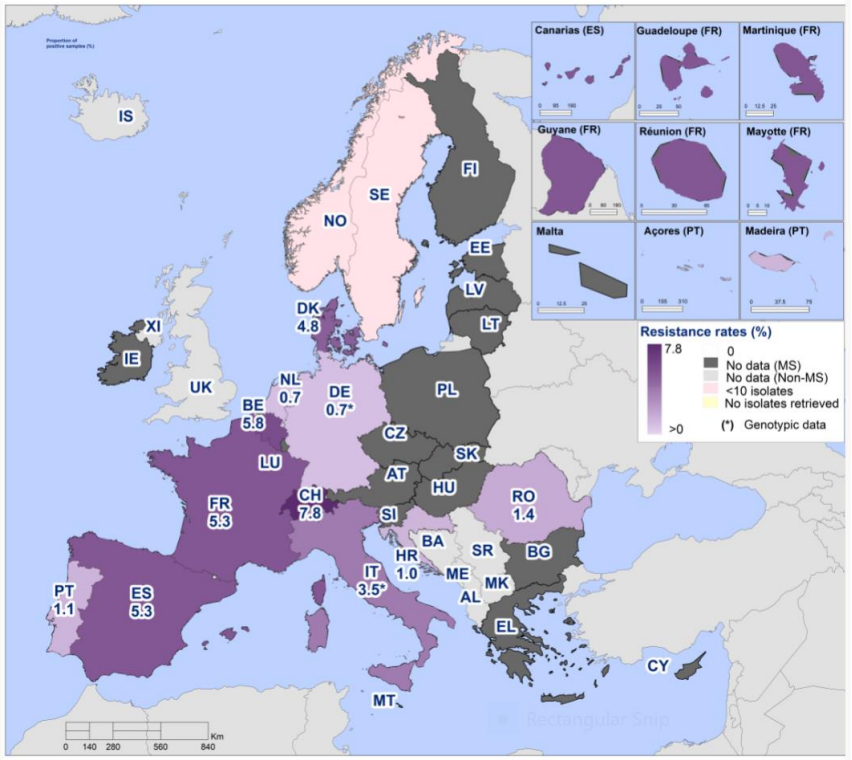
Countries displayed in grey colour (No data) include countries collecting samples without reporting any positive findings (0% prevalence) and countries not reporting any data.

Figure 4: Spatial distribution of the prevalence of presumptive AmpC-producing *Escherichia coli* from (a) pig meat in 2021, (b) cattle meat in 2021, (c) broiler meat in 2022 and (d) turkey meat in 2022, EU MSs and non-MSs, 2021-2022.

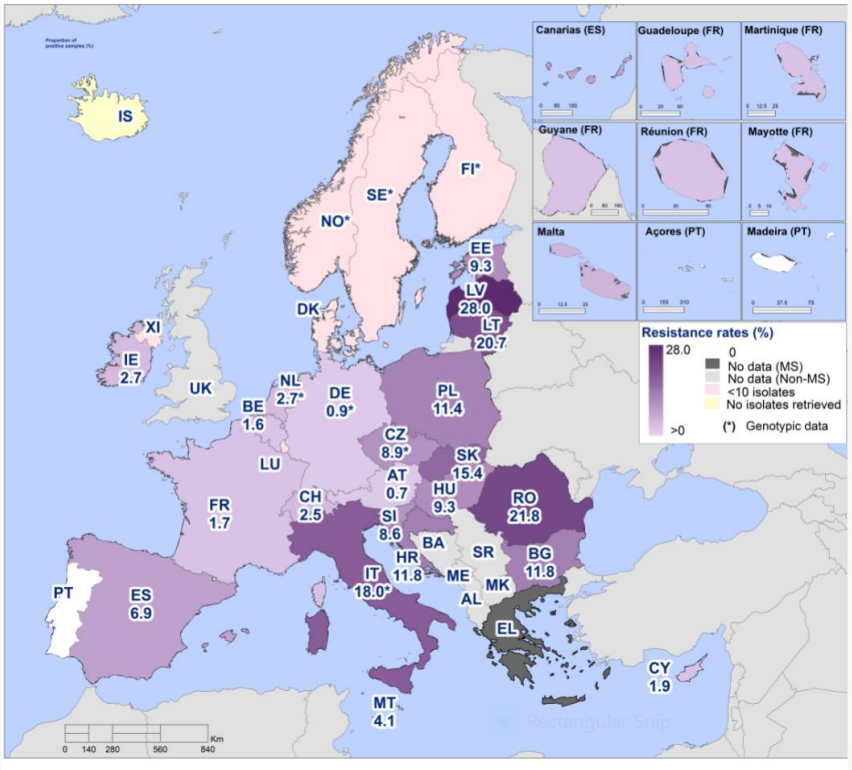
(a)


Canarias (ES)
Guadeloupe (FR)
Martinique (FR)
Guyane (FR)
Réunion (FR)
Mayotte (FR)
Malta
Açores (PT)
Madeira (PT)
Resistance rates (%)
33.3
0
No data (MS)
No data (Non-MS)
<10 isolates
No isolates retrieved
>0
(*) Genotypic data
IS
FI 5.9*
SE 7.3
NO 13.7
EE 9.5
LV 0.7
LT 9.3
DK 16.1
XI 2.9
IE 13.7
UK
NL 7.0
DE 6.7*
BE 7.5
PL 6.6
CZ 18.2*
SK 14.8
LU 2.4
AT 3.3
HU 13.7
RO 14.2
CH 1.7
FR 1.1
SI 33.3
BA
SR
BG
HR 8.0
ME
MK
IT 18.6*
AL
PT 5.5
ES 9.7
EL 1.4
CY
MT
0 140 280 560 840 Km

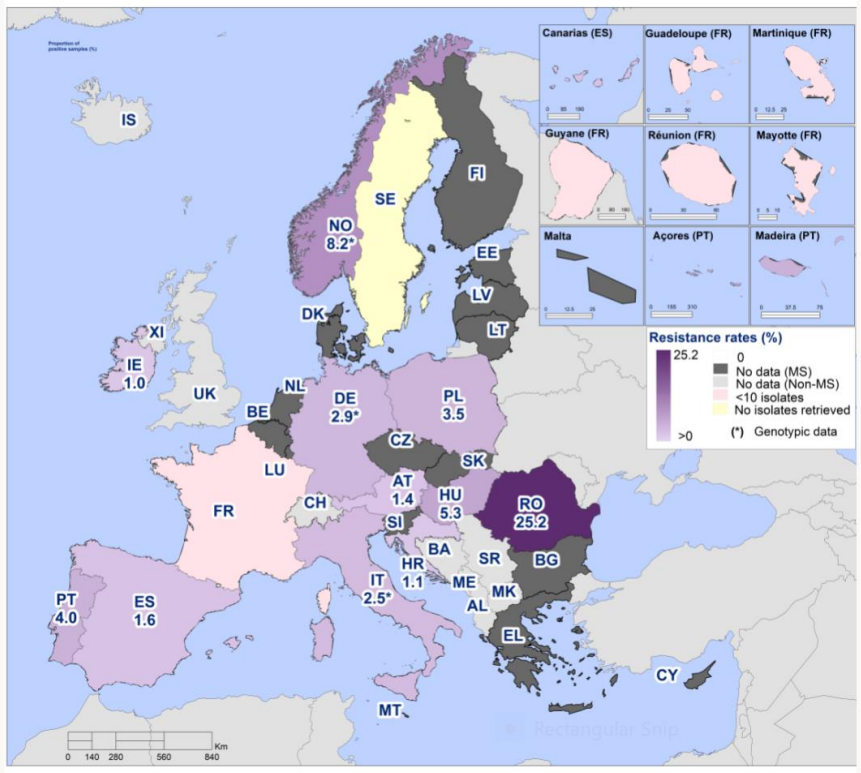
(b)


Canarias (ES)
Guadeloupe (FR)
Martinique (FR)
Guyane (FR)
Réunion (FR)
Mayotte (FR)
Malta
Açores (PT)
Madeira (PT)
Resistance rates (%)
7.8
0
No data (MS)
No data (Non-MS)
<10 isolates
No isolates retrieved
>0
(*) Genotypic data
IS
FI
SE
NO
EE
LV
LT
DK 4.8
XI
IE
UK
NL 0.7
DE 0.7*
BE 5.8
PL
CZ
SK
LU
AT
HU
RO 1.4
CH 7.8
FR 5.3
SI
BA
SR
BG
HR 1.0
ME
MK
IT 3.5*
AL
PT 1.1
ES 5.3
EL
CY
MT
0 140 280 560 840 Km

(c)



(d)



Countries displayed in grey colour (No data) include countries collecting samples without reporting any positive findings (0% prevalence) and countries not reporting any data.

Figure 5: Spatial distribution of the prevalence of presumptive AmpC-producing *Escherichia coli* from (a) fattening pigs in 2021, (b) cattle under one year of age in 2021, (c) broilers in 2022 and (d) fattening turkeys in 2022, EU MSs and non-MSs, 2021-2022.

D.3. ESBL-, AmpC- and/or carbapenemase-producers prevalence and occurrence tables – pigs and cattle and meat thereof, 2021

Table 1: **Presumptive ESBL- and AmpC-producing *Salmonella* spp.** isolated **from fattening pigs and cattle under one year** of age collected within **the routine monitoring** and subjected to supplementary testing (Panel 2) in 2021.

Country	NP1	NP2[a]	ESBL and/or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
			n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Cattle under one year of age																
Italy*	20	1	1	5	1	5	-	-	-	-	0	0	0	0	0	0
Spain	20	1	1	5	0	0	1	5	0	0	0	0	1	5	0	0
Total (2 MSs)	**40**	**2**	**2**	**5**	**0**	**0**	**1**	**2.5**	**0**	**0**	**0**	**0**	**1**	**2.5**	**0**	**0**
Pigs - fattening pigs																
Hungary	80	4	4	5	3	3.8	1	1.3	0	0	0	0	1	1.3	0	0
Italy*	91	1	1	1.1	1	1.1	-	-	-	-	0	0	0	0	0	0
Luxembourg	37	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Romania	104	6	6	5.8	5	4.8	0	0	0	0	0	0	1	1	0	0
Total (4 MSs)	**312**	**15**	**11**	**3.5**	**9**	**2.9**	**1**	**0.3**	**0**	**0**	**0**	**0**	**2**	**0.6**	**0**	**0**

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; NP1: total number of isolates tested with Panel 1; NP2: total number of isolates tested with Panel 2 or whole genome sequencing

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

(h) Percentage of total number of isolates tested (NP1)

Table 2: **Presumptive ESBL- and AmpC-producing indicator *Escherichia coli*** isolated **from fattening pigs** collected within the **routine monitoring** and subjected to supplementary testing (Panel 2) in 2021.

Country			ESBL and/or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
	NP1	NP2	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Austria	175	2	2	1.1	2	1.1	0	0	0	0	0	0	0	0	0	0
Bulgaria	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyprus	22	1	1	4.5	1	4.5	0	0	0	0	0	0	0	0	0	0
Czechia	178	4	4	2.2	1	0.6	0	0	0	0	3	1.7	0	0	0	0
Denmark	65	1	1	1.5	0	0	0	0	0	0	1	1.5	0	0	0	0
Estonia	143	2	1	0.7	1	0.7	0	0	0	0	0	0	0	0	0	0
France	232	2	2	0.9	1	0.47	0	0	0	0	1	0.4	0	0	0	0
Hungary	170	7	7	4.1	7	4.1	2	1.2	0	0	0	0	0	0	0	0
Italy*	170	1	1	0.6	1	0.6	-	-	-	-	0	0	0	0	0	0
Latvia	152	2	2	1.3	2	1.3	2	1.3	0	0	0	0	0	0	0	0
Lithuania	100	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Poland	212	4	4	1.9	4	1.9	0	0	1	0.5	0	0	0	0	0	0
Portugal	55	3	3	5.5	3	5.5	0	0	0	0	0	0	0	0	0	0
Romania	169	8	8	4.7	4	2.4	1	0.6	0	0	4	2.4	0	0	0	0
Slovenia	85	2	2	2.4	1	1.2	1	1.2	0	0	1	1.2	0	0	0	0
Spain	170	2	2	1.2	2	1.2	0	0	0	0	0	0	0	0	0	0
Sweden	173	1	1	0.6	0	0	0	0	0	0	1	0.6	0	0	0	0
Total (16 MSs)	**2 371**	**45**	**42**	**1.8**	**31**	**1.3**	**6**	**0.3**	**1**	**<0.1**	**11**	**0.5**	**0**	**0**	**0**	**0**
Iceland	85	1	1	1.2	1	1.2	0	0	1	1.2	0	0	0	0	0	0

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; NP1 and NP2: number of isolates tested with Panel 1 and Panel 2, respectively

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

(c) Isolates showing synergy with CTX only, suggesting presence of ESBL with cefotaximase activity.
(d) Isolates showing synergy with CAZ only, suggesting presence of ESBL with ceftazidimase activity.
(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.
(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.
(g) Isolates with meropenem resistance or CP-encoding gene reported.
(h) Percentage of total number of isolates tested with Panel 1.

Table 3: Presumptive ESBL- and AmpC-producing indicator *Escherichia coli* isolated from cattle under one year of age collected within the **routine monitoring** and subjected to supplementary testing (Panel 2) in 2021.

Country			ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
	NP1	NP2	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Belgium	173	3	2	1.2	2	1.2	0	0	0	0	0	0	0	0	0	0
France	181	2	2	1.1	1	0.5	1	0.5	0	0	1	0.5	0	0	0	0
Germany*	203	9	5	2.5	5	2.5	-	-	-	-	0	0	0	0	0	0
Italy*	170	7	7	4.1	7	4.1	-	-	-	-	0	0	0	0	0	0
Netherlands	306	2	2	0.7	2	0.7	1	0.3	0	0	0	0	0	0	0	0
Portugal	53	1	1	1.9	1	1.9	0	0	0	0	0	0	0	0	0	0
Romania	129	1	1	0.8	1	0.8	0	0	0	0	0	0	0	0	0	0
Total (6 MSs)	**1 215**	**25**	**20**	**1.6**	**19**	**1.6**	**2**	**0.2**	**0**	**0**	**1**	**0.1**	**0**	**0**	**0**	**0**
Norway	288	6	4	1.4	0	0	0	0	0	0	4	1.4	0	0	0	0
Switzerland	180	2	2	1.1	1	0.6	0	0	0	0	1	0.6	0	0	0	0

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; NP1 and NP2: number of isolates tested with Panel 1 and Panel 2, respectively.

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

(h) Percentage of total number of isolates tested with Panel 1.

Table 4: Prevalence of presumptive ESBL- and/or AmpC-producing *Escherichia coli* in pig meat at retail collected within the specific monitoring of ESBL-/AmpC-/CP-producers in 2021.

Country	Ns	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[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	8.5	5.7 - 12.1	7.9	5.2 - 11.4	1.3	0.3 - 3.2	0	0 - 1.2	0.6	0.1 - 2.3	0	0 - 1.2	0	0 - 1.2
Belgium	300	2	0.7 - 4.3	1.7	0.5 - 3.8	0.3	0 - 1.8	0	0 - 1.2	0	0 - 1.2	0.3	0 - 1.8	0	0 - 1.2
Bulgaria	150	14.7	9.4 - 21.4	13.3	8.3 - 19.8	6	2.8 - 11.1	0.7	0 - 3.7	1.3	0.2 - 4.7	0	0 - 2.4	0	0 - 2.4
Croatia	139	2.2	0.4 - 6.2	2.2	0.4 - 6.2	0.7	0 - 3.9	0	0 - 2.6	0	0 - 2.6	0	0 - 2.6	0	0 - 2.6
Cyprus	143	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
Czechia*	294	8.2	5.3 - 11.9	6.5	3.9 - 9.9	-	-	-	-	1.7	0.6 - 3.9	0	0 - 1.2	0	0 - 1.2
Denmark	337	4.7	2.7 - 7.6	3.6	1.9 - 6.1	1.2	0.3 - 3	0	0 - 1.1	1.2	0.3 - 3	0	0 - 1.1	0	0 - 1.1
Estonia	150	12	7.3 - 18.3	10.8	6.2 - 16.7	3.6	1.1 - 7.6	0	0 - 2.4	1.2	0.2 - 4.7	0	0 - 2.4	0	0 - 2.4
Finland	313	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	321	0.9	0.2 - 2.7	0.6	0.1 - 2.2	0	0 - 1.1	0	0 - 1.1	0.3	0 - 1.7	0	0 - 1.1	0	0 - 1.1
Germany*	466	5.1	3.3 - 7.6	4.5	2.8 - 6.8	-	-	-	-	0.7	0.1 - 1.9	0	0 - 0.8	0	0 - 0.8
Greece	76	5.3	1.5 - 12.9	5.3	1.5 - 12.9	1.3	0 - 7.1	0	0 - 4.7	0	0 - 4.7	0	0 - 4.7	0	0 - 4.7
Hungary	300	11	7.7 - 15.1	9.3	6.3 - 13.2	5	2.8 - 8.1	0.7	0.1 - 2.4	1.7	0.5 - 3.8	0	0 - 1.2	0.3	0 - 1.8
Ireland	300	2.7	1.2 - 5.2	1.7	0.5 - 3.8	0.3	0 - 1.8	0	0 - 1.2	1	0.2 - 2.9	0	0 - 1.2	0	0 - 1.2
Italy*	305	7.9	5.1 – 11.5	5.1	3 - 8.4	-	-	-	-	2.7	1.1 - 5.1	0	0 - 1.2	0	0 - 1.2
Latvia	150	16	10.5 - 22.9	14.7	9.4 - 21.4	7.3	3.7 - 12.7	0	0 - 2.4	0.7	0 - 3.7	0.7	0 - 3.7	0	0 - 2.4
Lithuania	150	10.7	6.2 - 16.7	8	4.2 - 13.6	2	0.4 - 5.7	0	0 - 2.4	2.7	0.7 - 6.7	0	0 - 2.4	0	0 - 2.4
Luxembourg	120	5	1.9 – 10.6	4.2	1.4 – 9.5	0.8	0 - 4.6	0	0 - 3	0.8	0 - 4.6	0	0 - 3	0	0 - 3
Malta	150	14	8.9 - 20.6	11.3	6.7 – 17.5	2.7	0.7 - 6.7	0	0 - 2.4	1.3	0.2 - 4.7	1.3	0.2 - 4.7	0	0 - 2.4
Netherlands	320	1.6	0.5 – 3.6	1.3	0.3 - 3	0.9	0.2 – 2.7	0	0 – 1.1	0.3	0 – 1.7	0	0 – 1.1	0	0 – 1.1
Poland	310	6.1	3.7 - 9.4	5.5	3.2 - 8.6	1.3	0.4 - 3.3	0	0 - 1.2	0.6	0.1 - 2.3	0	0 - 1.2	0	0 - 1.2
Portugal	102	11.8	6.2 - 19.6	8.8	4.1 – 16.1	2	0.2 - 6.9	0	0 - 3.6	1	0 – 5.3	2	0.2 - 6.9	0	0 - 3.6
Romania	300	11.3	8 - 15.5	8	5.2 - 11.7	1.3	0.4 - 3.4	0	0 - 1.2	3.3	1.6 - 6	0	0 - 1.2	0	0 - 1.2
Slovakia	149	18.8	12.9 - 26	15.4	10 - 22.3	6.7	3.3 - 12	0	0 - 2.4	3.4	1.1 - 7.7	0	0 - 2.4	0	0 - 2.4
Slovenia	152	13.8	8.8 - 20.3	8.6	4.6 - 14.2	4.6	1.9 - 9.3	0	0 - 2.4	5.3	2.3 - 10.1	0	0 - 2.4	0	0 - 2.4

Country	Ns	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI
Spain	300	15.7	11.7 - 20.3	13.3	9.7 – 17.7	2.3	0.9 - 4.7	0	0 - 1.2	2	0.7 - 4.3	0.3	0 - 1.8	0	0 - 1.2
Sweden	296	0	0 - 1.5	0	0 - 1.5	0	0 - 1.5	0	0 - 1.5	0	0 - 1.5	0	0 - 1.5	0	0 - 1.5
Total (27 MSs)	**6 411**	**6.9**	**6.3 - 7.6**	**5.6**	**5.1 - 6.2**	**1.8**	**1.5 - 2.2**	**<0.1**	**0 - 0.2**	**1.2**	**1 - 1.5**	**0.1**	**0 - 0.2**	**<0.1**	**0 - 0.1**
Norway	311	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
Switzerland	309	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

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; CI: confidence interval.

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

Table 5: **Occurrence of presumptive ESBL- and/or AmpC-producing** *Escherichia coli* **in pig meat at retail collected within the specific monitoring** of ESBL-/AmpC-/CP-producers in 2021.

Country		ESBL and or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
	NP2[a]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Austria	27	27	100	25	92.6	4	14.8	0	0	2	7.4	0	0	0	0
Belgium	6	6	100	5	83.3	1	16.7	0	0	0	0	1	16.7	0	0
Bulgaria	22	22	100	20	90.9	9	40.9	1	4.5	2	9.1	0	0	0	0
Croatia	3	3	100	3	100	1	33.3	0	0	0	0	0	0	0	0
Czechia*	24	24	100	19	79.2	-	-	-	-	5	20.8	0	0	0	0
Denmark	16	16	100	12	75	4	25	0	0	4	25	0	0	0	0
Estonia	10	10	100	9	90	3	30	0	0	1	10	0	0	0	0
France	3	3	100	2	66.7	0	0	0	0	1	33.3	0	0	0	0
Germany*	23	23	100	20	87	-	-	-	-	3	13	0	0	0	0
Greece	4	4	100	4	100	1	25	0	0	0	0	0	0	0	0
Hungary	34	33	97.1	28	82.4	15	44.1	2	5.9	5	14.7	0	0	1	2.9
Ireland	8	8	100	5	62.5	1	12.5	0	0	3	37.5	0	0	0	0
Italy*	23	23	100	15	65.2	-	-	-	-	8	34.8	0	0	0	0
Latvia	24	24	100	22	91.7	11	45.8	0	0	1	4.2	1	4.2	0	0
Lithuania	16	16	100	12	75	3	18.8	0	0	4	25	0	0	0	0
Luxembourg	6	6	100	5	83.3	1	16.7	0	0	1	16.7	0	0	0	0
Malta	21	21	100	17	81	4	19	0	0	2	9.5	2	9.5	0	0
Netherlands	5	5	100	4	80	3	60	0	0	1	20	0	0	0	0
Poland	20	19	95	17	85	4	20	0	0	2	10	0	0	0	0
Portugal	12	12	100	9	75	2	16.7	0	0	1	8.3	2	16.7	0	0
Romania	34	34	100	24	70.6	4	11.8	0	0	10	29.4	0	0	0	0
Slovakia	28	28	100	23	82.1	10	35.7	0	0	5	17.9	0	0	0	0
Slovenia	21	21	100	13	61.9	7	33.3	0	0	8	38.1	0	0	0	0

Country	NP2[a]	ESBL and or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Spain	47	47	100	40	85.1	7	14.9	0	0	6	12.8	1	2.1	0	0
Total (23 MSs)	**437**	**435**	**99.5**	**353**	**80.8**	**95**	**21.7**	**3**	**0.7**	**75**	**17.1**	**7**	**1.6**	**1**	**0.2**
Norway	1	1	100	0	0	0	0	0	0	1	100	0	0	0	0

ESBL: extended-spectrum beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; NP2: total number of isolates tested with Panel 2 or whole genome sequencing

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

(h) Percentage of total number of isolates tested with Panel 2 or WGS.

Table 6: **Prevalence of presumptive ESBL- and/or AmpC-producing** *Escherichia coli* **in fattening pigs collected within the** specific monitoring **of ESBL-/AmpC-/CP-producers in 2021.**

Country	Ns	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[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	301	62.8	57.1 - 68.3	59.5	53.7 - 65.1	10.3	7.1 - 14.3	0.3	0 - 1.8	3.3	1.6 - 6	0	0 - 1.2	0	0 - 1.2
Belgium	300	39.6	34.1 - 45.4	32.1	26.8 - 37.6	9.3	6.3 - 13.2	0.4	0 - 1.8	7.5	4.7 - 10.9	0	0 - 1.2	0	0 - 1.2
Bulgaria	191	30.9	24.4 - 38	30.4	23.9 - 37.4	12.6	8.2 - 18.1	0	0 - 1.9	0	0 - 1.9	0.5	0 - 2.9	0	0 - 1.9
Croatia	261	65.4	59.4 - 71.3	57.4	51.2 - 63.5	23.9	18.7 - 29.4	0	0 - 1.4	8	5 - 12	0	0 - 1.4	0	0 - 1.4
Czechia*	302	50.3	44.5 - 56.1	32.1	26.9 - 37.7	-	-	-	-	18.2	14 - 23	0	0 - 1.2	0	0 - 1.2
Denmark	272	20.2	15.6 - 25.5	4.1	2 - 7.1	1.5	0.4 - 3.7	0	0 - 1.3	16.1	12 - 21.1	0	0 - 1.3	0	0 - 1.3
Estonia	158	31.6	24.5 - 39.5	22.2	15.9 - 29.4	0	0 - 2.3	0	0 - 2.3	9.5	5.4 - 15.2	0	0 - 2.3	0	0 - 2.3
Finland*	307	6.5	4 - 9.9	0.7	0.1 - 2.3	-	-	-	-	5.9	3.5 - 9.1	0	0 - 1.2	0	0 - 1.2
France	350	10.9	7.8 - 14.6	8.9	6.1 - 12.3	1.4	0.5 - 3.3	0.9	0.2 - 2.5	1.1	0.3 - 2.9	0.9	0.2 - 2.5	0	0 - 1
Germany*	382	44	38.9 - 49.1	37.3	32.3 - 42.2	-	-	-	-	6.7	4.5 - 9.8	0	0 - 1	0	0 - 1
Greece	74	35.1	24.4 - 47.1	33.8	23.2 - 45.7	0	0 - 4.9	0	0 - 4.9	1.4	0 - 7.3	0	0 - 4.9	0	0 - 4.9
Hungary	300	67	61.4 - 72.3	52.7	46.8 - 58.4	16.7	12.6 - 21.4	0.3	0 - 1.8	13.7	10 - 18.1	0.7	0.1 - 2.4	0	0 - 1.2
Ireland	300	37.7	32.2 - 43.4	23	18.4 - 28.2	13.3	9.7 - 17.7	0	0 - 1.2	13.7	10 - 18.1	1	0.2 - 2.9	0	0 - 1.2
Italy*	301	80.7	75.8 - 85	62.5	56.7 - 67.9	-	-	-	-	18.6	14.4 - 23.5	0.3	0 - 1.8	0	0 - 1.2
Latvia	152	50	41.8 - 58.2	49.3	41.1 - 57.6	19.1	13.2 - 26.2	0	0 - 2.4	0.7	0 - 3.6	0	0 - 2.4	0	0 - 2.4
Lithuania	150	38	30.2 - 46.3	28.7	21.6 - 36.6	6.7	3.2 - 11.9	0	0 - 2.4	9.3	5.2 - 15.2	0	0 - 2.4	0	0 - 2.4
Luxembourg	206	42.7	35.9 - 49.8	39.3	32.6 - 46.3	14.1	9.6 - 19.6	0	0 - 1.8	2.4	0.8 - 5.6	1	0.1 - 3.5	0	0 - 1.8
Malta	128	26.6	19.1 - 35.1	22.7	15.7 - 30.9	0.8	0 - 4.3	2.3	0.5 - 6.7	0	0 - 2.8	3.9	1.3 - 8.9	0	0 - 2.8
Netherlands	300	15.7	11.7 – 20.3	8.7	5.7 - 12.4	1.7	0.5 - 3.8	0	0 - 1.2	7	4.4 - 10.5	0	0 - 1.2	0	0 - 1.2
Poland	302	35.1	29.7 - 40.8	28.2	23.1 - 33.6	3.3	1.6 - 6	0.3	0 - 1.8	6.6	4.1 - 10	0.3	0 - 1.8	0	0 - 1.2

Country	Ns	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI
Portugal	99	51.5	41.3 - 61.7	41.7	31.6 - 51.8	6.6	2.9 - 14	1.1	0 - 5.5	5.5	1.7 - 11.4	4.4	1.1 - 10	0	0 - 3.7
Romania	239	69.5	63.2 - 75.2	53.1	46.6 - 59.6	10.5	6.9 - 15.1	0.8	0.1 - 3	14.2	10.1 - 19.3	2.1	0.7 - 4.8	0	0 - 1.5
Slovakia	149	58.4	50 - 66.4	41.6	33.6 - 50	19.5	13.4 - 26.7	0.7	0 - 3.7	14.8	9.5 – 21.5	2	0.4 - 5.8	0	0 - 2.4
Slovenia	153	57.5	49.3 - 65.5	23.5	17.1 - 31.1	8.5	4.6 - 14.1	0	0 - 2.4	33.3	25.9 - 41.4	0.7	0 - 3.6	0	0 - 2.4
Spain	423	77.1	72.8 - 81	59.6	54.7 - 64.3	13.2	10.2 - 16.8	0.2	0 - 1.3	9.7	7 – 12.9	7.8	5.4 - 10.8	0	0 - 0.9
Sweden	300	8.3	5.5 - 12.1	1	0.2 - 2.9	0	0 - 1.2	0	0 - 1.2	7.3	4.7 - 10.9	0	0 - 1.2	0	0 - 1.2
United Kingdom (Northern Ireland)	68	60.3	47.7 - 72	57.4	44.8 - 69.3	22.1	12.9 - 33.8	0	0 - 5.3	2.9	0.4 - 10.2	0	0 - 5.3	0	0 - 5.3
Total (26 MSs + XI)	**6468**	**43.3**	**42 – 44.5**	**33**	**31.8 - 34.1**	**8.9**	**8.1 - 9.7**	**0.3**	**0.2 - 0.5**	**9.3**	**8.6 - 10**	**1.0**	**0.8 - 1.3**	**0**	**0 - 0.1**
Iceland	152	3.3	1.1 - 7.5	3.3	1.1 - 7.5	0	0 - 2.4	3.3	1.1 - 7.5	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4
Norway	321	14.6	11 - 19	0.9	0.2 - 2.7	0	0 - 1.1	0	0 - 1.1	13.7	10.1 - 18	0	0 - 1.1	0	0 - 1.1
Switzerland	289	5.9	3.5 - 9.3	4.2	2.2 - 7.1	2.1	0.8 - 4.5	0.3	0 - 1.9	1.7	0.6 - 4	0	0 - 1.3	0	0 - 1.3

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; CI: confidence interval ; XI: United Kingdom (Northern Ireland)

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

Table 7: Occurrence of presumptive ESBL- and/or AmpC-producing *Escherichia coli* in fattening pigs collected within the specific monitoring of ESBL-/AmpC-/CP-producers in 2021.

Country	NP2[a]	ESBL and or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Austria	189	189	100	179	94.7	31	16.4	1	0.5	10	5.3	0	0	0	0
Belgium	113	111	98.2	90	79.6	26	23	1	0.9	21	18.6	0	0	0	0
Bulgaria	59	59	100	58	98.3	24	40.7	0	0	0	0	1	1.7	0	0
Croatia	85	82	96.5	72	84.7	30	35.3	0	0	10	11.8	0	0	0	0
Czechia*	152	152	100	97	63.8	-	-	-	-	55	36.2	0	0	0	0
Denmark	57	54	94.7	11	19.3	4	7	0	0	43	75.4	0	0	0	0
Estonia	50	50	100	35	70	0	0	0	0	15	30	0	0	0	0
Finland*	20	20	100	2	10	-	-	-	-	18	90	0	0	0	0
France	40	38	95	31	77.5	5	12.5	3	7.5	4	10	3	7.5	0	0
Germany*	164	164	100	139	84.8	-	-	-	-	25	15.2	0	0	0	0
Greece	26	26	100	25	96.2	0	0	0	0	1	3.8	0	0	0	0
Hungary	203	201	99	158	77.8	50	24.6	1	0.5	41	20.2	2	1	0	0
Ireland	117	113	96.6	69	59	40	34.2	0	0	41	35	3	2.6	0	0
Italy*	243	243	100	188	77.4	-	-	-	-	56	23	1	0.4	0	0
Latvia	76	76	100	75	98.7	29	38.2	0	0	1	1.3	0	0	0	0
Lithuania	57	57	100	43	75.4	10	17.5	0	0	14	24.6	0	0	0	0
Luxembourg	92	88	95.7	81	88	29	31.5	0	0	5	5.4	2	2.2	0	0
Malta	34	34	100	29	85.3	1	2.9	3	8.8	0	0	5	14.7	0	0
Netherlands	47	47	100	26	55.3	5	10.6	0	0	21	44.7	0	0	0	0
Poland	106	106	100	85	80.2	10	9.4	1	0.9	20	18.9	1	0.9	0	0
Portugal	47	47	100	38	80.9	6	12.8	1	2.1	5	10.6	4	8.5	0	0
Romania	167	166	99.4	127	76	25	15	2	1.2	34	20.4	5	3	0	0
Slovakia	87	87	100	62	71.3	29	33.3	1	1.1	22	25.3	3	3.4	0	0

Country	NP2[a]	ESBL and or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Slovenia	88	88	100	36	40.9	13	14.8	0	0	51	58	1	1.1	0	0
Spain	327	326	99.7	252	77.6	56	17.1	1	0.3	41	12.5	33	10.1	0	0
Sweden	25	25	100	3	12	0	0	0	0	22	88	0	0	0	0
United Kingdom (Northern Ireland)	43	41	95.3	39	90.7	15	34.9	0	0	2	4.7	0	0	0	0
Total (26 MSs + XI)	**2 714**	**2 690**	**99.1**	**2 050**	**75.5**	**438**	**16.1**	**15**	**0.6**	**578**	**21.3**	**64**	**2.4**	**0**	**0**
Iceland	14	5	35.7	5	35.7	0	0	5	35.7	0	0	0	0	0	0
Norway	47	47	100	3	6.4	0	0	0	0	44	93.6	0	0	0	0
Switzerland	17	17	100	12	70.6	6	35.3	1	5.9	5	29.4	0	0	0	0

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; NP2: total number of isolates tested with Panel 2 or whole genome sequencing ; XI : United Kingdom (Northern Ireland) *Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

(h) Percentage of total number of isolates tested with Panel 2 or WGS.

Table 8: **Prevalence of presumptive ESBL- and/or AmpC-producing** *Escherichia coli* **in cattle meat collected within the** specific monitoring **of ESBL-/AmpC-/CP-producers in 2021.**

Country	Ns	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[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	336	3.3	1.6 - 5.8	3	1.4 - 5.4	0.9	0.2 - 2.6	0	0 - 1.1	0.3	0 - 1.6	0	0 - 1.1	0	0 - 1.1
Belgium	300	3.3	1.6 - 6	3.3	1.6 - 6	0.3	0 - 1.8	0	0 - 1.2	0	0 - 1.2	0	0 - 1.2	0	0 - 1.2
Bulgaria	150	13.3	8.3 - 19.8	12.7	7.8 - 19.1	2.7	0.7 - 6.7	0	0 - 2.4	0.7	0 - 3.7	0	0 - 2.4	0	0 - 2.4
Croatia	130	3.1	0.8 - 7.7	2.3	0.5 - 6.6	1.5	0.2 - 5.4	0	0 - 2.8	0.8	0 - 4.2	0	0 - 2.8	0	0 - 2.8
Cyprus	139	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
Czechia*	298	7.4	4.7 - 11	5.7	3.4 - 9	-	-	-	-	1.7	0.5 - 3.9	0	0 - 1.2	0	0 - 1.2
Denmark	280	5.4	3 - 8.7	2.9	1.2 - 5.6	0.4	0 - 2	0	0 - 1.3	2.5	1 - 5.1	0	0 - 1.3	0	0 - 1.3
Estonia	150	12	7.3 - 18.3	9	5.2 - 15.2	1.5	0.2 - 4.7	0	0 - 2.4	3	0.7 - 6.7	0	0 - 2.4	0	0 - 2.4
Finland	308	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	312	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
Germany*	418	2.2	1 - 4	2.2	1 - 4	-	-	-	-	0	0 - 0.9	0	0 - 0.9	0	0 - 0.9
Greece	75	4	0.8 - 11.2	4	0.8 - 11.2	0	0 - 4.8	0	0 - 4.8	0	0 - 4.8	0	0 - 4.8	0	0 - 4.8
Hungary	300	30.7	25.5 - 36.2	28.7	23.6 - 34.1	12.7	9.1 - 17	0	0 - 1.2	1.7	0.5 - 3.9	0.3	0 - 1.8	0.7	0.1 - 2.4
Ireland	300	1.7	0.5 - 3.8	0.3	0 - 1.8	0	0 - 1.2	0	0 - 1.2	1.3	0.4 - 3.4	0	0 - 1.2	0	0 - 1.2
Italy*	301	4.3	2.3 - 7.3	3.7	1.8 – 6.4	-	-	-	-	0.7	0.1 - 2.4	0	0 - 1.2	0	0 - 1.2
Latvia	150	16.7	11.1 - 23.6	16	10.5 - 22.9	8.7	4.7 - 14.4	0.7	0 - 3.7	0.7	0 - 3.7	0	0 - 2.4	0	0 - 2.4
Lithuania	150	8.7	4.7 - 14.4	8.7	4.7 - 14.4	2	0.4 - 5.7	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4
Luxembourg	67	7.5	2.5 - 16.6	7.5	2.5 - 16.6	0	0 - 5.4	0	0 - 5.4	0	0 - 5.4	0	0 - 5.4	0	0 - 5.4
Malta	150	12	7.3 - 18.3	10	5.7 - 16	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4	1.3	0.2 - 4.7	0	0 - 2.4
Netherlands	583	2.4	1.3 - 4	2.1	1.1 - 3.6	0.2	0 - 1	0	0 - 0.6	0.3	0 - 1.2	0	0 - 0.6	0	0 - 0.6
Poland	307	5.9	3.5 - 9.1	5.5	3.3 - 8.7	2	0.7 - 4.2	0.3	0 - 1.8	0.3	0 - 1.8	0	0 - 1.2	0	0 - 1.2
Portugal	125	6.4	2.8 - 12.2	5.6	2.3 - 11.2	0.8	0 - 4.4	0	0 - 2.9	0	0 - 2.9	0.8	0 - 4.4	0	0 - 2.9
Romania	150	8	4.2 - 13.6	7.3	3.7 - 12.7	0.7	0 - 3.7	0	0 - 2.4	0	0 - 2.4	0.7	0 - 3.7	0	0 - 2.4

Country	Ns	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI
Slovakia	150	7.3	3.7 - 12.7	6	2.8 - 11.1	2	0.4 - 5.7	0	0 - 2.4	1.3	0.2 - 4.7	0	0 - 2.4	0	0 - 2.4
Slovenia	152	5.3	2.3 - 10.1	3.3	1.1 - 7.5	2	0.4 - 5.7	0	0 - 2.4	2	0.4 - 5.7	0	0 - 2.4	0	0 - 2.4
Spain	300	3.7	1.8 - 6.5	3.3	1.6 - 6	0.6	0.1 - 2.4	0	0 - 1.2	0.7	0 - 1.8	0	0 - 1.2	0	0 - 1.2
Sweden	303	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
Total (27 MSs)	**6 384**	**5.8**	**5.2 – 6.3**	**5**	**4.5 - 5.6**	**1.4**	**1.1 - 1.8**	**<0.1**	**0 - 0.1**	**0.6**	**0.5 – 0.9**	**0.1**	**0 - 0.2**	**<0.1**	**0 - 0.1**
Switzerland	614	0	0 - 0.6	0	0 - 0.6	0	0 - 0.6	0	0 - 0.6	0	0 - 0.6	0	0 - 0.6	0	0 - 0.6

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; CI: confidence interval

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

Table 9: **Occurrence of presumptive ESBL- and/or AmpC-producing** *Escherichia coli* **in cattle meat collected at retail within the** specific monitoring **of ESBL-/AmpC-/CP-producers in 2021.**

Country	NP2[a]	ESBL and or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Austria	11	11	100	10	90.9	3	27.3	0	0	1	9.1	0	0	0	0
Belgium	10	10	100	10	100	1	10	0	0	0	0	0	0	0	0
Bulgaria	20	20	100	19	95	4	20	0	0	1	5	0	0	0	0
Croatia	4	4	100	3	75	2	50	0	0	1	25	0	0	0	0
Czechia*	22	22	100	17	77.3	-	-	-	-	5	22.7	0	0	0	0
Denmark	15	15	100	8	53.3	1	6.7	0	0	7	46.7	0	0	0	0
Estonia	8	8	100	6	75	1	12.5	0	0	2	25	0	0	0	0
France	1	1	100	0	0	0	0	0	0	1	100	0	0	0	0
Germany*	10	9	90	9	90	-	-	-	-	0	0	0	0	0	0
Greece	3	3	100	3	100	0	0	0	0	0	0	0	0	0	0
Hungary	94	92	97.9	86	91.5	38	40.4	0	0	5	5.3	1	1.1	2	2.1
Ireland	5	5	100	1	20	0	0	0	0	4	80	0	0	0	0
Italy*	13	13	100	11	84.6	-	-	-	-	2	15.4	0	0	0	0
Latvia	25	25	100	24	96	13	52	1	4	1	4	0	0	0	0
Lithuania	14	13	92.9	13	92.9	3	21.4	0	0	0	0	0	0	0	0
Luxembourg	5	5	100	5	100	0	0	0	0	0	0	0	0	0	0
Malta	18	18	100	15	83.3	0	0	0	0	1	5.6	2	11.1	0	0
Netherlands	14	14	100	12	85.7	1	7.1	0	0	2	14.3	0	0	0	0
Poland	18	18	100	17	94.4	6	33.3	1	5.6	1	5.6	0	0	0	0
Portugal	8	8	100	7	87.5	1	12.5	0	0	0	0	1	12.5	0	0
Romania	12	12	100	11	91.7	1	8.3	0	0	0	0	1	8.3	0	0
Slovakia	11	11	100	9	81.8	3	27.3	0	0	2	18.2	0	0	0	0

Country	NP2[a]	ESBL and or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Slovenia	8	8	100	5	62.5	3	37.5	0	0	3	37.5	0	0	0	0
Spain	11	11	100	10	90.9	2	18.2	0	0	1	9.1	0	0	0	0
Sweden	1	1	100	1	100	0	0	0	0	0	0	0	0	0	0
Total (25 MSs)	**361**	**357**	**98.9**	**312**	**86.4**	**83**	**23**	**2**	**0.6**	**40**	**11.1**	**5**	**1.4**	**2**	**0.6**

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; NP2: total number of isolates tested with Panel 2 or whole genome sequencing

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

(h) Percentage of total number of isolates tested with Panel 2 or WGS.

Table 10: **Prevalence of presumptive ESBL- and/or AmpC-producing** *Escherichia coli* **in cattle under one year of age collected within the** specific monitoring **of ESBL-/AmpC-/CP-producers in 2021.**

Country	Ns	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[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	301	59.1	53.3 - 64.7	51.6	45.7 - 57.3	10	6.8 - 13.9	1	0.2 - 2.9	5.8	3.6 - 9.2	1.7	0.5 - 3.8	0	0 - 1.2
Croatia	203	44.3	37.4 - 51.5	43.3	36.4 - 50.5	14.1	9.8 - 19.9	0	0 - 1.8	1	0.1 - 3.5	0	0 - 1.8	0	0 - 1.8
Denmark	293	5.8	3.4 - 9.1	1	0.2 - 3	0.3	0 - 1.9	0	0 - 1.3	4.8	2.6 - 7.9	0	0 - 1.3	0	0 - 1.3
France	281	14.2	10.4 - 18.9	8.5	5.5 - 12.4	2.1	0.8 - 4.6	0	0 - 1.3	5.3	3 - 8.7	0.4	0 - 2	0	0 - 1.3
Germany*	299	65.2	59.5 - 70.6	64.5	58.8 - 70	-	-	-	-	0.7	0.1 - 2.4	0	0 - 1.2	0	0 - 1.2
Italy*	310	90.3	86.5 - 93.4	86.8	82.5 - 90.3	-	-	-	-	3.5	1.8 - 6.3	0	0 - 1.2	0	0 - 1.2
Netherlands	306	33.3	28.1 - 38.9	31.7	26.5 - 37.2	3.5	1.8 - 6.3	0	0 - 1.2	0.7	0.1 - 2.3	1	0.2 - 2.8	0	0 - 1.2
Portugal	99	17.2	10.3 - 26.1	13.7	8 - 22.6	4.6	1.7 - 11.4	0	0 - 3.7	1.1	0 - 5.5	2.3	0.2 - 7.1	0	0 - 3.7
Romania	141	22.7	16.1 - 30.5	20.6	14.2 - 28.2	4.3	1.6 - 9	0	0 - 2.6	1.4	0.2 - 5	0.7	0 - 3.9	0	0 - 2.6
Spain	413	43.8	39 - 48.8	34.6	30 - 39.4	19.1	15.4 - 23.3	0	0 - 0.9	5.3	3.4 - 8	3.9	2.2 - 6.2	0	0 - 0.9
Sweden	20	10	1.2 - 31.7	10	1.2 - 31.7	0	0 - 16.8	0	0 - 16.8	0	0 - 16.8	0	0 - 16.8	0	0 - 16.8
Total (11 MSs)	**2 666**	**42.5**	**40.6 - 44.4**	**38**	**36.2 – 39.9**	**6.2**	**5.3 - 7.2**	**0.1**	0 - 0.3	**3.4**	**2.7 – 4.1**	**1.1**	**0.7 - 1.5**	**0**	**0 - 0.1**
Norway	295	1	0.2 - 2.9	0	0 - 1.2	0	0 - 1.2	0	0 - 1.2	1	0.2 - 2.9	0	0 - 1.2	0	0 - 1.2
Switzerland	294	23.5	18.7 - 28.7	15.6	11.7 - 20.3	4.8	2.6 - 7.9	0	0 - 1.2	7.8	5 - 11.5	0	0 - 1.2	0	0 - 1.2

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; CI: confidence interval

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported. (g) Isolates with meropenem resistance or CP-encoding gene reported.

Table 11: **Occurrence of presumptive ESBL- and/or AmpC-producing** *Escherichia coli* **in cattle under one year of age collected within the** specific monitoring **of ESBL-/AmpC-/CP-producers in 2021.**

Country		ESBL and or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
	NP2[a]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Belgium	174	172	98.9	150	86.2	29	16.7	3	1.7	17	9.8	5	2.9	0	0
Croatia	85	85	100	83	97.6	27	31.8	0	0	2	2.4	0	0	0	0
Denmark	18	17	94.4	3	16.7	1	5.6	0	0	14	77.8	0	0	0	0
France	42	40	95.2	24	57.1	6	14.3	0	0	15	35.7	1	2.4	0	0
Germany*	193	192	99.5	190	98.5	-	-	-	-	2	1	0	0	0	0
Italy*	280	280	100	269	96.1	-	-	-	-	11	3.9	0	0	0	0
Netherlands	103	102	99	97	94.2	11	10.7	0	0	2	1.9	3	2.9	0	0
Portugal	15	15	100	12	80	4	26.7	0	0	1	6.7	2	13.3	0	0
Romania	32	32	100	29	90.6	6	18.8	0	0	2	6.3	1	3.1	0	0
Spain	181	181	100	143	79	79	43.6	0	0	22	12.2	16	8.8	0	0
Sweden	2	2	100	2	100	0	0	0	0	0	0	0	0	0	0
Total (11 MSs)	**1 125**	**1 118**	**99.4**	**1 002**	**89.1**	**163**	**14.5**	**3**	**0.3**	**88**	**7.8**	**28**	**2.5**	**0**	**0**
Norway	3	3	100	0	0	0	0	0	0	3	100	0	0	0	0
Switzerland	70	69	98.6	46	65.7	14	20	0	0	23	32.9	0	0	0	0

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; NP2: total number of isolates tested with Panel 2 or whole genome sequencing

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

(c) Isolates showing synergy with CTX only, suggesting presence of ESBL with cefotaximase activity.
(d) Isolates showing synergy with CAZ only, suggesting presence of ESBL with ceftazidimase activity.
(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.
(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.
(g) Isolates with meropenem resistance or CP-encoding gene reported.
(h) Percentage of total number of isolates tested with Panel 2 or WGS.

D.4. ESBL-, AmpC- and/or carbapenemase-producers prevalence and occurrence tables – poultry and meat thereof, 2022

Table 12: Presumptive ESBL- and AmpC-producing *Salmonella* spp. **isolates from broilers, laying hens and imported broiler meat (sampled at border control posts),** collected within the **routine monitoring** and subjected to supplementary testing (Panel 2) in 2022.

Country	NP1	NP2[a]	ESBL and or AmpC		ESBL [b]		ESBL only CLA/CTX SYN [c]		ESBL only CLA/CAZ SYN [d]		AmpC [e]		ESBL + AmpC [f]		CPs [g]	
			n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Gallus gallus (fowl) - laying hens																
Italy*	174	2	2	1.1	2	1.1	-	-	-	-	0	0	0	0	0	0
Luxembourg	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total (2 MSs)	**176**	**4**	**2**	**1.1**	**2**	**1.1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Gallus gallus (fowl) - broilers																
Hungary	170	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Italy*	190	21	21	11.1	21	11.1	-	-	-	-	0	0	0	0	0	0
Luxembourg	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malta	21	4	4	19	4	19	0	0	0	0	0	0	0	0	0	0
Poland	167	1	1	0.6	1	0.6	0	0	0	0	0	0	0	0	0	0
Total (4 MSs)	**552**	**31**	**26**	**4.7**	**26**	**4.7**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Turkeys - fattening flocks																
Italy*	184	15	15	8.2	15	8.2	-	-	-	-	0	0	0	0	0	0
Total (1 MS)	**184**	**15**	**15**	**8.2**	**15**	**8.2**	**-**	**-**	**-**	**-**	**0**	**0**	**0**	**0**	**0**	**0**
Meat from broilers - fresh, sampled at border control posts																
Germany*	5	2	2	40	0	0	-	-	-	-	2	40	0	0	0	0
Ireland	8	5	5	62.5	0	0	0	0	0	0	5	62.5	0	0	0	0
Netherlands*	32	27	27	84.4	2	6.3	-	-	-	-	25	78.1	0	0	0	0
Spain	12	8	8	66.7	2	16.7	0	0	0	0	6	50	0	0	0	0
Total (4 MSs)	**57**	**42**	**42**	**73.7**	**4**	**7**	**0**	**0**	**0**	**0**	**38**	**66.7**	**0**	**0**	**0**	**0**

Country	NP1	NP2[a]	ESBL and or AmpC		ESBL [b]		ESBL only CLA/CTX SYN [c]		ESBL only CLA/CAZ SYN [d]		AmpC [e]		ESBL + AmpC [f]		CPs [g]	
			n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Meat from turkey - fresh, sampled at border control posts																
Netherlands*	3	2	2	66.7	0	0	-	-	-	-	2	66.7	0	0	0	0
Total (1 MS)	3	2	2	66.7	0	0	-	-	-	-	2	66.7	0	0	0	0

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; NP1: total number of isolates tested with Panel 1; NP2: total number of isolates tested with Panel 2 or whole genome sequencing

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

(h) Percentage of total number of isolates tested (NP1).

Table 13: **Presumptive ESBL and AmpC producing indicator *Escherichia coli*** isolates **from broiler flocks collected within the routine monitoring** and subjected to supplementary testing (Panel 2) in 2022**.**

Country	NP1	NP2	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
			n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Belgium	168	6	6	3.6	5	3	0	0	1	0.6	0	0	1	0.6	0	0
Cyprus	110	11	7	6.4	6	5.5	1	0.9	1	0.9	1	0.9	0	0	0	0
Denmark	195	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Estonia	149	7	3	2	1	0.7	0	0	0	0	0	0	2	1.3	0	0
Germany*	274	6	3	1.1	3	0.9	-	-	-	-	0	0	0	0	0	0
Greece	121	1	1	0.8	0	0	0	0	0	0	1	0.8	0	0	0	0
Hungary	170	1	1	0.6	1	0.6	0	0	0	0	0	0	0	0	0	0
Ireland	170	1	1	0.6	0	0	0	0	0	0	1	0.6	0	0	0	0
Malta	127	9	8	6.3	8	6.3	2	1.6	0	0	0	0	0	0	0	0
Netherlands	300	1	1	0.3	1	0.3	-	-	-	-	0	0	0	0	0	0
Poland	184	9	7	3.8	7	3.8	2	1.1	0	0	0	0	0	0	0	0
Portugal	170	2	2	1.2	2	1.2	0	0	0	0	0	0	0	0	0	0
Romania	170	7	7	4.1	5	2.9	1	0.6	0	0	2	1.2	0	0	0	0
Spain	170	1	1	0.6	0	0	0	0	0	0	1	0.6	0	0	0	0
Total (14 MSs)	**2 478**	**63**	**48**	**1.9**	**39**	**1.6**	**6**	**0.2**	**2**	**0.1**	**6**	**0.2**	**3**	**0.1**	**0**	**0**
Switzerland	229	1	1	0.4	1	0.4	0	0	0	0	0	0	0	0	0	0

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; NP1 and NP2: number of isolates tested with Panel 1 and Panel 2, respectively

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

(d) Isolates showing synergy with CAZ only, suggesting presence of ESBL with ceftazidimase activity.
(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.
(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.
(g) Isolates with meropenem resistance or CP-encoding gene reported.
(h) Percentage of total number of isolates tested with Panel 1.

Table 14: **Presumptive ESBL- and AmpC-producing indicator** *Escherichia coli* **isolates from fattening turkeys collected within the routine monitoring** and subjected to supplementary testing (Panel 2) **in 2022.**

Country	NP1	NP2	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
			n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Belgium	86	4	3	3.5	3	3.5	1	1.2	0	0	0	0	0	0	0	0
Germany*	230	6	1	0.4	1	0.4	-	-	-	-	0	0	0	0	0	0
Italy*	170	2	1	0.6	1	0.6	-	-	-	-	0	0	0	0	1	0.6
Poland	178	7	6	3.4	5	2.8	0	0	0	0	1	0.6	0	0	0	0
Portugal	170	3	2	1.2	2	1.2	0	0	0	0	0	0	0	0	0	0
Spain	170	5	5	2.9	5	2.9	0	0	0	0	0	0	0	0	0	0
Total (6 MSs)	**1 004**	**27**	**18**	**1.8**	**17**	**1.7**	**1**	**0.1**	**0**	**0**	**1**	**0.1**	**0**	**0**	**1**	**0.1**
Norway	110	1	1	0.9	0	0	0	0	0	0	1	0.9	0	0	0	0

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; NP1 and NP2: number of isolates tested with Panel 1 and Panel 2, respectively

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

(h) Percentage of total number of isolates tested with Panel 1.

Table 15: Prevalence of presumptive ESBL- and AmpC-producing *Escherichia coli* isolates from broiler meat collected within the specific monitoring of ESBL-/AmpC-/CP-producers in 2022**.**

Country	Ns	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[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	338	24.3	19.8 - 29.2	17.2	13.3 – 21.6	5.9	3.7 - 9	3.3	1.6 - 5.7	6.5	4.1 – 9.7	0.6	0.1 - 2.1	0	0 - 1.1
Belgium	312	56.7	51 - 62.3	54.2	48.5 - 59.8	2.6	1.1 - 5	2.2	0.9 - 4.6	1.6	0.5 – 3.7	1.0	0.2 - 2.8	0	0 - 1.2
Bulgaria	150	43.3	35.3 - 51.7	24.7	18 - 32.4	2.7	0.7 - 6.7	1.3	0.2 - 4.7	14.7	9.4 – 21.4	4	1.5 - 8.5	0	0 - 2.4
Croatia	131	31.3	23.5 - 40	26	18.7 - 34.3	6.1	2.7 - 11.7	0	0 - 2.8	5.3	2.2 - 10.7	0	0 - 2.8	0	0 - 2.8
Cyprus	152	30.3	23.1 - 38.2	25.7	18.9 - 33.4	3.9	1.5 - 8.4	0	0 - 2.4	2	0.4 - 5.7	2.6	0.7 - 6.6	0	0 - 2.4
Czechia*	296	28	23 - 33.5	23.3	18.6 - 28.6	-	-	-	-	5.1	2.9 - 8.2	0.3	0 - 1.9	0	0 - 1.2
Denmark	352	3.4	1.8 - 5.9	2.3	1 - 4.4	0.3	0 - 1.6	0.3	0 - 1.6	1.1	0.3 - 2.9	0	0 - 1	0	0 - 1
Estonia	148	44.6	36.4 - 53	26.8	20.1 - 34.9	10.3	5.8 - 16.2	0	0 - 2.5	13.7	8.5 - 20.1	4.1	1.5 - 8.6	0	0 - 2.5
Finland*	300	1.7	0.5 - 3.8	1.7	0.5 - 3.8	-	-	-	-	0	0 - 1.2	0	0 - 1.2	0	0 - 1.2
France	323	9.3	6.4 - 13	5.3	3.1 - 8.3	1.2	0.3 – 3.1	0.2	0 - 1.7	3.7	1.9 - 6.4	0.2	0 - 1.7	0	0 - 1.1
Germany*	467	33	28.7 - 37.4	31.2	27.1 - 35.7	-	-	-	-	1.8	0.7 - 3.3	0	0 - 0.8	0	0 - 0.8
Hungary	300	61.3	55.6 - 66.9	46.7	40.9 - 52.5	21.7	17.1 - 26.8	0.6	0.1 - 2.4	11.7	8.3 - 15.9	3	1.4 - 5.6	0	0 - 1.2
Ireland	300	8	5.2 - 11.7	7	4.4 - 10.5	1.3	0.4 - 3.4	0.7	0.1 - 2.4	1	0.2 - 2.9	0	0 - 1.2	0	0 - 1.2
Italy*	302	40.1	34.5 - 45.8	28.5	23.5 - 33.9	-	-	-	-	14.6	10.8 - 19.1	3	1.4 - 5.6	0	0 - 1.2
Latvia	151	37.7	30 - 46	19.9	13.8 - 27.1	4.6	1.9 - 9.3	0	0 - 2.4	17.9	12.1 - 24.9	0	0 - 2.4	0	0 - 2.4
Lithuania	150	8.7	4.7 - 14.4	5.3	2.3 - 10.2	0.7	0 - 3.7	0	0 - 2.4	3.3	1.1 - 7.6	0	0 - 2.4	0	0 - 2.4
Luxembourg	57	45.6	32.4 - 59.3	43.9	30.7 - 57.6	1.8	0 - 9.4	10.5	4 - 21.5	1.8	0 - 9.4	0	0 - 6.3	0	0 - 6.3
Malta	150	34.7	27.1 - 42.9	31.3	24 - 39.4	6	2.8 - 11.1	1.3	0.2 - 4.7	2	0.4 - 5.7	1.3	0.2 - 4.7	0	0 - 2.4
Netherlands*	187	13.4	8.8 - 19.1	12.3	8 - 17.9	-	-	-	-	1.1	0.1 - 3.8	0	0 - 2	0	0 - 2
Poland	305	34.8	34.2 - 43.9	24.9	23 - 31.9	8.9	6.3 - 12.2	0	0 - 0.9	8.9	8.1 – 14.4	1	0.2 - 2.2	0	0 - 0.9
Portugal	218	27.1	21.3 - 33.5	24.3	18.8 - 30.6	2.8	1 - 5.9	0	0 - 1.7	1.4	0.3 - 4	1.4	0.3 - 4	0	0 - 1.7
Romania	303	39.6	34.1 - 45.4	24.8	20 - 30	3.6	1.8 - 6.4	0	0 - 1.2	14.2	10.5 - 18.6	0.7	0.1 - 2.4	0	0 - 1.2
Slovakia	150	50.6	42.4 - 58.9	41.9	34 - 50.3	21.6	15.1 - 28.8	0	0 - 2.4	8.1	4.2 - 13.6	0.7	0 - 3.7	0	0 - 2.4

Country	Ns	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI
Slovenia	153	32.7	25.3 - 40.7	24.2	17.6 - 31.8	10.5	6.1 - 16.4	2.6	0.7 - 6.6	8.5	4.6 - 14.1	0	0 - 2.4	0	0 - 2.4
Spain	300	53.3	49.3 - 57.4	42	36.4 - 47.8	6.3	3.9 - 9.7	0	0 - 1.2	8.7	5.7 - 12.4	2.7	1.5 - 4.3	0	0 - 1.2
Sweden*	296	1.7	0.6 - 3.9	0.7	0.1 - 2.4	-	-	-	-	1	0.2 - 2.9	0	0 - 1.2	0	0 - 1.2
Total (26 MSs)	**6 291**	**29.2**	**28.5 - 30.7**	**22.9**	**21.9 - 24**	**6**	**5.3 – 6.7**	**0.9**	**0.6 - 1.2**	**5.8**	**5.4 - 6.6**	**1**	**0.7 - 1.2**	**0**	**0 - 0.1**
Norway	302	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
Switzerland	307	16.6	12.6 - 21.3	14.3	10.6 - 18.8	4.2	2.3 - 7.1	1	0.2 - 2.8	2	0.7 - 4.2	0.3	0 - 1.8	0	0 - 1.2

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; CI: confidence interval

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

Table 16: **Occurrence of presumptive ESBL- and AmpC-producing** *Escherichia coli* **isolates from broiler meat collected within the** specific monitoring **of ESBL-/AmpC-/CP-producers in 2022.**

Country		ESBL and or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
	NP2[a]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Austria	86	82	95.3	58	67.4	20	23.3	11	12.8	22	25.6	2	2.3	0	0
Belgium	182	177	97.3	169	92.9	8	4.4	8	4.4	5	2.7	3	1.6	0	0
Bulgaria	65	65	100	37	56.9	4	6.2	2	3.1	22	33.8	6	9.2	0	0
Croatia	41	41	100	34	82.9	8	19.5	0	0	7	17.1	0	0	0	0
Cyprus	46	46	100	39	84.8	6	13	0	0	3	6.5	4	8.7	0	0
Czechia*	83	83	100	69	83.1	-	-	-	-	15	18.1	1	1.2	0	0
Denmark	12	12	100	8	66.7	1	8.3	1	8.3	4	33.3	0	0	0	0
Estonia	66	65	98.5	39	59.1	15	22.7	0	0	20	30.3	6	9.1	0	0
Finland*	5	5	100	5	100	-	-	-	-	0	0	0	0	0	0
France	31	30	96.8	17	54.8	4	12.9	1	3.2	12	38.7	1	3.2	0	0
Germany*	148	148	100	140	94.6	-	-	-	-	8	5.4	0	0	0	0
Hungary	186	184	98.9	140	75.3	65	34.9	2	1.1	35	18.8	9	4.8	0	0
Ireland	25	24	96	21	84	4	16	2	8	3	12	0	0	0	0
Italy*	126	121	96	86	68.3	-	-	-	-	44	34.9	9	7.1	0	0
Latvia	59	57	96.6	30	50.8	7	11.9	0	0	27	45.8	0	0	0	0
Lithuania	13	13	100	8	61.5	1	7.7	0	0	5	38.5	0	0	0	0
Luxembourg	26	26	100	25	96.2	1	3.8	6	23.1	1	3.8	0	0	0	0
Malta	52	52	100	47	90.4	9	17.3	2	3.8	3	5.8	2	3.8	0	0
Netherlands*	27	25	92.6	23	85.2	-	-	-	-	2	7.4	0	0	0	0
Poland	161	157	97.5	110	68.3	36	22.4	0	0	44	27.3	3	1.9	0	0
Portugal	59	59	100	53	89.8	6	10.2	0	0	3	5.1	3	5.1	0	0
Romania	120	120	100	75	62.5	11	9.2	0	0	43	35.8	2	1.7	0	0
Slovakia	80	75	93.8	62	77.5	32	40	0	0	12	15	1	1.2	0	0
Slovenia	51	50	98	37	72.5	16	31.4	4	7.8	13	25.5	0	0	0	0

Country	NP2[a]	ESBL and or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Spain	160	160	100	126	78.8	19	11.9	0	0	26	16.3	8	5	0	0
Sweden*	5	5	100	2	40	-	-	-	-	3	60	0	0	0	0
Total (26 MSs)	**1 915**	**1 882**	**98.3**	**1 460**	**76.2**	**273**	**14.3**	**39**	**2**	**382**	**19.9**	**60**	**3.1**	**0**	**0**
Switzerland	54	51	94.4	45	83.3	13	24.1	3	5.6	6	11.1	1	1.9	0	0

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; NP2: total number of isolates tested with Panel 2 or whole genome sequencing

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

(h) Percentage of total number of isolates tested with Panel 2 or WGS.

Table 17: **Prevalence of presumptive ESBL- and AmpC-producing** *Escherichia coli* **isolates from broilers collected within the** specific monitoring **of ESBL-/AmpC-/CP-producers in 2022.**

Country	Ns	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[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	301	10.6	7.4 - 14.7	9.6	6.5 - 13.5	2.3	0.9 - 4.7	2.7	1.2 - 5.2	0.7	0.1 - 2.4	0.3	0 - 1.8	0.7	0.1 - 2.4
Belgium	248	72.1	66.2 - 77.7	67.2	61.1 - 73.1	6.2	3.4 - 9.8	5.8	3.1 - 9.3	1.7	0.4 - 4.1	3.3	1.4 - 6.3	0	0 - 1.5
Bulgaria	456	62.7	58.1 - 67.2	46.9	42.3 - 51.6	1.1	0.4 - 2.5	0.9	0.2 - 2.2	11.8	9 - 15.2	3.9	2.4 - 6.2	0.2	0 - 1.2
Croatia	144	59.7	51.2 - 67.8	47.9	39.5 - 56.4	18.8	12.7 - 26.1	0	0 - 2.5	11.8	7 - 18.2	0	0 - 2.5	0	0 - 2.5
Cyprus	154	20.8	14.7 - 28	16.2	10.8 - 23	3.2	1.1 - 7.4	0	0 - 2.4	2	0.4 - 5.6	2.6	0.7 - 6.5	0	0 - 2.4
Czechia*	293	36.9	31.3 - 42.7	28.3	23.2 - 33.9	-	-	-	-	8.9	5.9 - 12.7	0.3	0 - 1.9	0	0 - 1.3
Denmark	697	1.3	0.6 - 2.4	0.7	0.2 - 1.7	0.4	0.1 - 1.3	0	0 - 0.5	0.6	0.2 - 1.5	0	0 - 0.5	0	0 - 0.5
Estonia	150	56	47.7 - 64.1	42	34 – 50.3	0.7	0 - 3.7	1.3	0.2 - 4.7	9.3	5.2 - 15.2	4.7	1.9 - 9.4	0	0 - 2.4
Finland*	301	1.3	0.4 - 3.4	1.3	0.4 - 3.4	-	-	-	-	0	0 - 1.2	0	0 - 1.2	0	0 - 1.2
France	406	8.9	6.3 - 12.1	6.9	4.6 - 9.8	0.7	0.2 - 2.1	0.2	0 - 1.4	1.7	0.7 - 3.5	0.2	0 - 1.4	0	0 - 0.9
Germany*	333	41.1	34.6 – 45.4	40.2	34.9 - 45.7	-	-	-	-	0.9	0.2 - 2.6	0	0 - 1.1	0	0 - 1.1
Hungary	300	62	56.2 - 67.5	50.3	44.5 - 56.1	21.7	17.1 - 26.8	0	0 - 1.2	9.3	6.3 - 13.2	2.3	0.9 - 4.7	0	0 - 1.2
Ireland	300	9	6 - 12.8	6.3	3.9 - 9.7	1.7	0.5 - 3.8	0.3	0 - 1.8	2.7	1.2 - 5.2	0	0 - 1.2	0	0 - 1.2
Italy*	479	46.8	42.2 - 51.3	29.2	25.2 - 33.5	-	-	-	-	18	14.6 - 21.7	0.4	0.1 - 1.5	0.2	0 - 1.2
Latvia	150	38	30.2 - 46.3	9.3	5.2 - 15.2	0.7	0 - 3.7	0.7	0 - 3.7	28	21 - 35.9	0.7	0 - 3.7	0	0 - 2.4
Lithuania	150	60.7	52.4 - 68.5	39.3	31.5 - 47.6	7.3	3.7 - 12.7	0	0 - 2.4	20.7	14.5 - 28	0.7	0 - 3.7	0	0 - 2.4
Luxembourg	45	17.8	8 - 32.1	17.8	8 - 32.1	0	0 - 7.9	0	0 - 7.9	0	0 - 7.9	0	0 - 7.9	0	0 - 7.9
Malta	126	46.8	37.9 - 55.9	41.9	33.3 - 51.2	4.1	1.3 - 9	0.8	0 - 4.3	4.1	1.3 - 9	0.8	0 - 4.3	0	0 - 2.9
Netherlands*	300	15.7	11.7 - 20.3	13	9.4 - 17.3	-	-	-	-	2.7	1.2 - 5.2	0	0 - 1.2	0	0 - 1.2

Country	Ns	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI	%P	95% CI
Poland	308	39	33.5 - 44.7	25.7	20.9 - 30.9	5.2	3 - 8.3	0	0 - 1.2	11.4	8 - 15.4	1.9	0.7 - 4.2	0	0 - 1.2
Portugal	402	46.8	41.8 - 51.8	43.7	38.9 - 48.8	5.4	3.5 - 8.2	0	0 - 0.9	0	0 - 0.9	3.1	1.6 - 5.2	0	0 - 0.9
Romania	450	73.6	69.2 - 77.6	48.6	44 - 53.4	13.1	10.1 - 16.6	0.2	0 - 1.2	21.8	18 - 25.9	3.1	1.7 - 5.2	0	0 - 0.8
Slovakia	150	86	79.4 - 91.1	70.5	62 - 77.2	44.3	35.9 - 52.3	0.7	0 - 3.7	15.5	10 - 22.1	0	0 - 2.4	0	0 - 2.4
Slovenia	151	48.3	40.1 - 56.6	39.7	31.9 - 48	15.2	9.9 - 22	0.7	0 - 3.6	8.6	4.7 - 14.3	0	0 - 2.4	0	0 - 2.4
Spain	564	42.6	38.4 - 46.8	33.7	29.8 – 37.8	5.7	3.9 - 7.9	0.2	0 - 1	6.9	5 - 9.3	2	1 - 3.5	0	0 - 0.7
Sweden*	302	3	1.4 - 5.6	1.7	0.5 - 3.8	-	-	-	-	1.3	0.4 - 3.4	0	0 - 1.2	0	0 - 1.2
United Kingdom (Northern Ireland)	308	1.6	0.5 - 3.7	1	0.2 - 2.8	0.3	0 - 1.8	0	0 - 1.2	0.6	0.1 - 2.3	0	0 - 1.2	0	0 - 1.2
Total (26 MSs+XI)	**7 968**	**34.9**	**39.9 - 36**	**26.8**	**25.8 - 27.8**	**6.3**	**5.7 - 6.9**	**0.6**	**0.4 - 0.8**	**7**	**6.5 - 7.6**	**1.2**	**1 - 1.5**	**0.1**	**0 - 0.1**
Iceland	153	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4
Norway*	363	0.6	0.1 - 2	0.3	0 - 1.5	-	-	-	-	0.3	0 - 1.5	0	0 - 1	0	0 - 1
Switzerland	510	4.1	2.6 - 6.2	1.6	0.7 - 3.1	0	0 - 0.7	0.6	0.1 - 1.7	2.5	1.4 - 4.3	0	0 - 0.7	0	0 - 0.7

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; CI: confidence interval ; XI: United Kingdom (Northern Ireland)

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

Table 18: **Occurrence of presumptive ESBL- and AmpC-producing** *Escherichia coli* **isolates from broilers collected within the** specific monitoring **of ESBL-/AmpC-/CP-producers in 2022.**

Country	NP2[a]	ESBL and or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Austria	37	32	86.5	29	78.4	7	18.9	8	21.6	2	5.4	1	2.7	2	5.4
Belgium	182	175	96.2	163	89.6	15	8.2	15	7.7	4	2.2	8	4.4	0	0
Bulgaria	288	286	99.3	214	74.3	5	1.7	4	1.4	54	18.8	18	6.3	1	0.3
Croatia	86	86	100	69	80.2	27	31.4	0	0	17	19.8	0	0	0	0
Cyprus	32	32	100	25	78.1	5	15.6	0	0	3	9.4	4	1.3	0	0
Czechia*	108	108	100	83	76.9	-	-	-	-	26	24.1	1	0.9	0	0
Denmark	9	9	100	5	55.6	3	33.3	0	0	4	44.4	0	0	0	0
Estonia	84	84	100	63	75	1	1.2	2	2.4	14	16.7	7	8.3	0	0
Finland*	4	4	100	4	100	-	-	-	-	0	0	0	0	0	0
France	38	36	94.7	28	73.7	3	7.9	1	2.6	7	18.4	1	2.6	0	0
Germany*	133	133	100	130	97.7	-	-	-	-	3	2.3	0	0	0	0
Hungary	186	186	100	151	81.2	65	34.9	0	0	28	15.1	7	3.8	0	0
Ireland	28	27	96.4	19	67.9	5	17.9	1	3.6	8	28.6	0	0	0	0
Italy*	231	224	97	140	60.6	-	-	-	-	86	37.2	2	0.9	1	0.4
Latvia	57	57	100	14	24.6	1	1.8	1	1.8	42	73.7	1	1.8	0	0
Lithuania	94	91	96.8	59	62.8	11	11.7	0	0	31	33	1	1.1	0	0
Luxembourg	8	8	100	8	100	0	0	0	0	0	0	0	0	0	0
Malta	57	57	100	51	89.5	5	8.8	1	1.8	5	8.8	1	1.8	0	0
Netherlands*	47	47	100	39	83	-	-	-	-	8	17	0	0	0	0
Poland	121	120	99.2	79	65.3	16	13.2	0	0	35	28	6	5	0	0
Portugal	181	181	100	169	93.4	21	11.6	0	0	0	0	12	6.6	0	0
Romania	331	330	99.7	218	65.9	59	17.8	1	0.3	98	29.6	14	4.2	0	0

Country	NP2[a]	ESBL and or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Slovakia	134	128	95.5	105	78.4	66	49.3	1	0.7	23	17.2	0	0	0	0
Slovenia	74	73	98.6	60	81.1	23	31.1	1	1.4	13	17.6	0	0	0	0
Spain	240	240	100	190	79.2	32	13.3	1	0.4	39	16.3	11	4.6	0	0
Sweden*	9	9	100	5	55.6	-	-	-	-	4	44.4	0	0	0	0
United Kingdom (Northern Ireland)	5	5	100	3	60	1	20	0	0	2	40	0	0	0	0
Total (26 MSs+XI)	**2 804**	**2 768**	**98.7**	**2 123**	**75.7**	**371**	**13.2**	**36**	**1.3**	**556**	**19.8**	**95**	**3.4**	**4**	**0.1**
Norway*	2	2	100	1	50	-	-	-	-	1	50	0	0	0	0
Switzerland	22	21	95.5	8	36.4	0	0	3	13.6	13	59.1	0	0	0	0

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; NP2: total number of isolates tested with Panel 2 or whole genome sequencing ; XI : United Kingdom (Northern Ireland)

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

(h) Percentage of total number of isolates tested with Panel 2 or WGS.

Table 19: **Prevalence of presumptive ESBL- and AmpC-producing** *Escherichia coli* **isolates from turkey meat collected within the** specific monitoring **of ESBL-/AmpC-/CP-producers in 2022.**

Country	Ns	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[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	181	40.9	33.6 - 48.4	31.5	24.8 - 38.8	3.3	1.2 - 7.1	0	0 - 2	7.2	3.9 - 12	2.2	0.6 - 5.6	0	0 - 2
Belgium	156	21.7	15.6 - 29.1	18.5	12.8 - 25.6	4.6	1.8 - 9	0	0 - 2.3	2.6	0.7 - 6.4	0.7	0 - 3.5	0	0 - 2.3
Croatia	110	10	5.1 - 17.2	9.1	4.4 - 16.1	1.8	0.2 - 6.4	0	0 - 3.3	0.9	0 - 5	0	0 - 3.3	0	0 - 3.3
Czechia*	152	17.1	11.5 - 24	14.5	9.3 - 21.1	-	-	-	-	2.6	0.7 - 6.6	0	0 - 2.4	0	0 - 2.4
Denmark	113	52.2	42.6 - 61.7	46.9	37.5 – 56.5	4.4	1.5 - 10	0	0 - 3.2	2.7	0.6 – 7.6	2.7	0.6 - 7.6	0	0 - 3.2
Finland	151	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4
France	321	7.2	4.6 - 10.6	4.7	2.6 - 7.6	0.6	0.1 - 2.2	0	0 - 1.1	2.5	1.1 – 4.9	0	0 - 1.1	0	0 - 1.1
Germany*	439	35.1	30.6 - 39.7	32.1	27.8 - 36.7	-	-	-	-	3	1.6 - 5	0	0 - 0.8	0	0 - 0.8
Hungary	150	24	17.4 - 31.6	20	13.9 - 27.3	6.7	3.2 - 11.9	0	0 - 2.4	4	1.5 - 8.5	0	0 - 2.4	0	0 - 2.4
Ireland	150	32.7	25.2 - 40.8	30	22.8 - 38	7.3	3.7 - 12.7	0	0 - 2.4	2.7	0.7 - 6.7	0	0 - 2.4	0	0 - 2.4
Italy*	294	18.7	14.4 - 23.6	17.7	13.5 - 22.5	-	-	-	-	3.1	1.4 - 5.7	2	0.8 - 4.4	0	0 - 1.2
Latvia	149	22.8	16.3 - 30.4	22.2	15.8 - 29.7	0	0 - 2.4	0	0 - 2.4	0.7	0 - 3.7	0	0 - 2.4	0	0 - 2.4
Lithuania	150	5.3	2.3 - 10.2	5.3	2.3 - 10.2	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4	0	0 - 2.4
Luxembourg	23	21.7	7.5 - 43.7	17.4	5 - 38.8	0	0 - 14.8	0	0 - 14.8	4.4	0.1 - 22	0	0 - 14.8	0	0 - 14.8
Malta	45	2.2	0.1 - 11.8	2.2	0.1 - 11.8	0	0 - 7.9	0	0 - 7.9	0	0 - 7.9	0	0 - 7.9	0	0 - 7.9
Poland	305	25.2	20.5 - 30.5	23	18.4 - 28.1	2.6	1.1 - 5.1	0	0 - 1.2	2	0.7 - 4.3	0.3	0 - 1.8	0	0 - 1.2
Portugal	218	27.5	21.7 - 34	22.9	17.5 - 29.1	5	2.5 - 8.8	0.5	0 - 2.5	0.9	0.1 - 3.3	3.7	1.6 - 7.1	0	0 - 1.7
Romania	150	13.3	8.3 - 19.8	9.3	5.2 - 15.2	1.3	0.2 - 4.7	0	0 - 2.4	2.7	0.7 – 6.7	1.3	0.2 - 4.7	0	0 - 2.4
Slovakia	149	33.6	26 - 41.7	27.5	20.5 - 35.4	8.7	4.7 - 14.5	0	0 - 2.4	4.7	1.9 – 9.4	1.3	0.2 - 4.8	0	0 - 2.4
Slovenia	153	30.7	23.5 - 38.7	27.5	20.6 - 35.2	5.9	2.7 - 10.9	0	0 - 2.4	3.3	1.1 - 7.5	0	0 - 2.4	0	0 - 2.4
Spain	150	64	55.8 - 71.7	58	49.7 - 66	5.3	2.3 - 10.2	1.3	0.2 - 4.7	0.7	0 – 3.7	5.3	2.3 - 10.2	0	0 - 2.4

Country	Ns	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		%P	95% CI	%P	95% CI	% P	95% CI	% P	95% CI	% P	95% CI	% P	95% CI	% P	95% CI
Sweden	81	0	0 - 4.5	0	0 - 4.5	0	0 - 4.5	0	0 - 4.5	0	0 - 4.5	0	0 - 4.5	0	0 - 4.5
Total (22 MSs)	**3 790**	**24.2**	**22.9 - 25.6**	**21.2**	**19.9 - 22.5**	**2.5**	**2 - 3**	**0.1**	**0 - 0.2**	**2.4**	**2 - 3**	**0.9**	**0.6 - 1.3**	**0**	**0 - 0.1**
Norway	121	0	0 - 3	0	0 - 3	0	0 - 3	0	0 - 3	0	0 - 3	0	0 - 3	0	0 - 3
Switzerland	139	18.7	12.6 - 26.2	15.8	10.2 - 23	2.2	0.4 - 6.2	0.7	0 - 3.9	2.9	0.8 - 7.2	0.7	0 - 3.9	0	0 - 2.6

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; CI: confidence interval

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

Table 20: **Occurrence of presumptive ESBL- and AmpC-producing** *Escherichia coli* **isolates from turkey meat collected within the** specific monitoring **of ESBL-/AmpC-/CP-producers in 2022.**

Country	NP2[a]	ESBL and or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Austria	74	74	100	57	77	6	8.1	0	0	13	17.6	4	5.4	0	0
Belgium	36	33	91.7	28	77.8	7	19.4	0	0	4	11.1	1	2.8	0	0
Croatia	11	11	100	10	90.9	2	18.2	0	0	1	9.1	0	0	0	0
Czechia*	26	26	100	22	84.6	-	-	-	-	4	15.4	0	0	0	0
Denmark	59	59	100	53	89.8	5	8.5	0	0	3	5.1	3	5.1	0	0
France	24	23	95.8	15	62.5	2	8.3	0	0	8	33.3	0	0	0	0
Germany*	151	151	100	138	91.4	-	-	-	-	13	8.6	0	0	0	0
Hungary	36	36	100	30	83.3	10	27.8	0	0	6	16.7	0	0	0	0
Italy*	56	55	98.2	52	92.9	-	-	-	-	9	16.1	6	10.7	0	0
Ireland†	50	49	98	45	90	11	22	0	0	4	8	0	0	0	0
Latvia	35	34	97.1	33	94.3	0	0	0	0	1	2.9	0	0	0	0
Lithuania	8	8	100	8	100	0	0	0	0	0	0	0	0	0	0
Luxembourg	5	5	100	4	80	0	0	0	0	1	20	0	0	0	0
Malta	1	1	100	1	100	0	0	0	0	0	0	0	0	0	0
Poland	77	77	100	70	90.9	8	10.4	0	0	6	7.8	1	1.3	0	0
Portugal	60	60	100	50	83.3	11	18.3	1	1.7	2	3.3	8	13.3	0	0
Romania	20	20	100	15	70	2	10	0	0	4	20	2	10	0	0
Slovakia	51	50	98	41	80.4	13	25.5	0	0	7	13.7	2	3.9	0	0
Slovenia	47	47	100	42	89.4	9	19.1	0	0	5	10.6	0	0	0	0
Spain	96	96	100	87	90.6	8	8.3	2	2.1	1	1	8	8.3	0	0
Total (20 MSs)	**923**	**915**	**99.1**	**800**	**86.7**	**94**	**10.2**	**3**	**0.3**	**92**	**10**	**35**	**3.8**	**0**	**0**

Country	NP2[a]	ESBL and or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
		n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Switzerland	26	26	100	22	84.6	3	11.5	1	3.8	3	11.5	1	3.8	0	0

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; NP2: total number of isolates tested with Panel 2 or whole genome sequencing

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

†Ireland also identified an isolate with CTX MIC=1 mg/L harbouring the *bla*$_{\text{TEM-52B}}$ gene. This is not included in the table, as it is not considered an ESBL-producer according to EUCAST guidelines (a).

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

(h) Percentage of total number of isolates tested with Panel 2 or WGS

Table 21: **Prevalence of presumptive ESBL- and AmpC-producing** *Escherichia coli* **isolates from fattening turkeys collected within the** specific monitoring **of ESBL-/AmpC-/CP-producers in 2022.**

Country	Ns	ESBL and or AmpC[a]		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[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	141	17.7	11.8 - 25.1	16.3	10.6 - 23.5	2.8	0.8 - 7.1	0	0 - 2.6	1.4	0.2 - 5	0	0 - 2.6	0	0 - 2.6
Croatia	94	11.7	6 - 20	10.6	5.2 - 18.7	2.1	0.3 - 7.5	0	0 - 3.8	1.1	0 - 5.8	0	0 - 3.8	0	0 - 3.8
France	420	1.9	0.8 - 3.7	1.2	0.4 - 2.8	0.5	0.1 - 1.7	0	0 - 0.9	0.7	0.1 - 2.1	0	0 - 0.9	0	0 - 0.9
Germany*	351	39	33.9 - 44.4	36.1	31.1 - 41.5	-	-	-	-	2.9	1.4 - 5.2	0	0 - 1	0	0 - 1
Hungary	300	19	14.7 - 23.9	13.7	10 - 18.1	6.3	3.9 - 9.7	0	0 - 1.2	5	2.8 - 8.1	0.3	0 - 1.8	0	0 - 1.2
Ireland	98	14.3	8 - 22.8	13.3	7.3 - 21.6	1	0 - 5.6	0	0 - 3.7	1	0 - 5.6	0	0 - 3.7	0	0 - 3.7
Italy*	397	29.2	24.8 - 34	26.7	22.4 - 31.3	-	-	-	-	2.5	1.2 - 4.6	0	0 - 0.9	0	0 - 0.9
Poland	374	24.1	19.8 - 28.7	20.6	16.6 - 25	2.1	0.9 - 4.2	0.5	0.1 - 1.9	2.7	1.3 - 4.9	0.8	0.2 - 2.3	0	0 - 1
Portugal	284	51.1	45.1 - 57	47	41.3 - 53.2	2.6	1 - 5	0	0 - 1.3	0	0 - 1.3	4	1.9 - 6.8	0	0 - 1.3
Romania	149	47.7	39.4 - 56	22.5	15.8 – 29.7	12.8	7.9 - 19.2	0	0 - 2.4	0.7	0 - 3.7	24.5	18.1 - 32.6	0	0 - 2.4
Spain	566	63.1	58.9 - 67.1	62.5	58.4 - 66.5	2.5	1.4 - 4.1	0.2	0 - 1	0.5	0.1 - 1.5	1.1	0.4 - 2.3	0	0 - 0.6
Sweden	34	0	0 - 10.3	0	0 - 10.3	0	0 - 10.3	0	0 - 10.3	0	0 - 10.3	0	0 - 10.3	0	0 - 10.3
Total (12 MSs)	**3 208**	**32.1**	**30.5 - 33.8**	**28.6**	**27 - 30.2**	**2.4**	**1.9 - 3**	**0.1**	**0 - 0.3**	**1.8**	**1.4 - 2.3**	**1.8**	**1.4 - 2.3**	**0**	**0 - 0.1**
Norway*	110	10	5.1 - 17.2	1.8	0.2 - 6.4	-	-	-	-	8.2	3.8 - 15	0	0 - 3.3	0	0 - 3.3

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; CI: confidence interval

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported. (g) Isolates with meropenem resistance or CP-encoding gene reported.

Table 22: **Occurrence of presumptive ESBL- and AmpC-producing** *Escherichia coli* **isolates from fattening turkeys collected within the** specific monitoring **of ESBL-/AmpC-/CP-producers in 2022.**

Country		ESBL and or AmpC		ESBL[b]		ESBL only CLA/CTX SYN[c]		ESBL only CLA/CAZ SYN[d]		AmpC[e]		ESBL + AmpC[f]		CPs[g]	
	NP2[a]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]	n	%[h]
Austria	25	25	100	23	92	4	16	0	0	2	8	0	0	0	0
Croatia	11	11	100	10	90.9	2	18.2	0	0	1	9.1	0	0	0	0
France	9	8	88.9	5	55.6	2	22.2	0	0	3	33.3	0	0	0	0
Germany*	133	133	100	123	92.5	-	-	-	-	10	7.5	0	0	0	0
Hungary	58	57	98.3	41	70.7	19	32.8	0	0	15	25.9	1	1.7	0	0
Ireland	14	14	100	13	92.9	1	7.1	0	0	1	7.1	0	0	0	0
Italy*	120	116	96.7	106	88.3	-	-	-	-	10	8.3	0	0	0	0
Poland	91	90	98.9	77	84.6	8	8.8	2	2.2	10	10.9	3	3.3	0	0
Portugal	140	140	100	129	92.1	7	5	0	0	0	0	11	7.9	0	0
Romania	70	70	100	33	47.1	19	27.1	0	0	1	1.4	36	51.4	0	0
Spain	357	357	100	348	97.5	14	3.9	1	0.3	3	0.8	6	1.7	0	0
Total (11 MSs)	**1,028**	**1,021**	**99.3**	**908**	**88.2**	**76**	**7.4**	**3**	**0.3**	**56**	**5.4**	**57**	**5.5**	**0**	**0**
Norway*	11	11	100	2	18.2	-	-	-	-	9	81.8	0	0	0	0

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; %: percentage of isolates from the total number tested; SYN: synergy; CTX: cefotaxime; CAZ: ceftazidime; CLA: clavulanate; MSs: Member States; NP2: total number of isolates tested with Panel 2 or whole genome sequencing

*Countries using WGS to identify ESBL-, AmpC- and/or CP-encoding genes

(a) According to EUCAST guidelines (EUCAST, 2017), only isolates showing MIC > 1 mg/L for CTX and/or CAZ were considered (see Appendix F, link).

(b) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

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

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

(e) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(f) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(g) Isolates with meropenem resistance or CP-encoding gene reported.

(h) Percentage of total number of isolates tested with Panel 2 or WGS.

D.5. Specific monitoring of carbapenemase-producing *Escherichia coli* in 2021-2022

For the specific monitoring of carbapenemase-producing *E. coli*, non-selective pre-enrichment and subsequent plating on selective carbapenem-containing media was used to isolate presumptive CP-producing bacteria. This was in accordance with the most recent version of the protocol provided by EURL-AR*. More information is provided in Appendix F.

Table 23: **Number of samples investigated and number of presumptive carbapenemase-producing *Escherichia coli* in the specific monitoring of CP-producers in 2021-2022.**

Country	Animal population/meat															
	Pig meat, 2021		Fattening pigs, 2021		Cattle meat, 2021		Cattle <1 years, 2021		Broiler meat, 2022		Broilers, 2022		Turkey meat, 2022		Fattening turkeys, 2022	
	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}	N_S	n_{CP}
Austria	319	0	301	0	323	0	-	-	340	0	298	0	177	0	137	0
Belgium	300	0	300	0	300	0	301	0	312	0	189	0	156	0	-	-
Bulgaria	150	0	191	0	151	0	-	-	150	0	456	0	-	-	-	-
Croatia	139	0	261	0	130	0	203	0	131	0	144	0	110	0	94	0
Cyprus	143	0	64	0	139	0	-	-	152	0	188	0	-	-	-	-
Czechia	294	0	302	3	298	0	-	-	296	0	293	0	152	0	-	-
Denmark	337	0	269	0	280	0	291	0	352	0	697	0	113	0	-	-
Estonia	150	0	158	0	150	0	-	-	148	0	150	0	-	-	-	-
Finland	313	0	307	0	308	0	-	-	300	0	301	0	151	0	-	-
France	321	0	350	0	312	0	281	0	323	0	406	0	321	0	420	0
Germany	457	0	376	0	417	0	296	0	462	0	386	0	442	0	351	0
Greece	76	0	74	0	75	0	-	-	156	0	91	0	-	-	-	-
Hungary	300	1	300	0	300	3	-	-	300	0	300	0	150	0	300	0
Ireland†	300	0	300	0	300	0	-	-	300	0	300	0	150	0	98	0
Italy	305	0	301	21	301	0	310	5	170	0	609	0	241	0	397	1
Latvia	-	-	-	-	-	-	-	-	151	0	150	0	149	0	-	-

Country	Animal population/meat															
	Pig meat, 2021		Fattening pigs, 2021		Cattle meat, 2021		Cattle <1 years, 2021		Broiler meat, 2022		Broilers, 2022		Turkey meat, 2022		Fattening turkeys, 2022	
	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}	N_S	n_{CP}
Luxembourg	-	-	-	-	-	-	-	-	57	0	45	0	23	0	-	-
Malta	-	-	-	-	-	-	-	-	-	-	126	0	-	-	-	-
Poland	310	0	302	0	307	0	-	-	403	0	308	0	305	0	375	0
Portugal	102	0	99	0	125	0	99	0	-	-	-	-	-	-	-	-
Romania	-	-	-	-	-	-	-	-	303	0	450	0	150	0	149	0
Slovakia	150	0	149	0	148	0	-	-	150	0	150	0	150	0	-	-
Slovenia	152	0	153	0	152	0	-	-	153	0	151	0	153	0	-	-
Spain	-	-	423	2	-	-	413	0	265	0	564	0	133	0	566	0
Sweden	296	0	300	0	303	0	20	0	296	0	302	0	81	0	34	0
Total (25 MSs)	**4 914**	**1**	**5 280**	**26**	**4 819**	**3**	**2 214**	**5**	**5 670**	**0**	**7 054**	**0**	**3 307**	**0**	**2 921**	**1**
Iceland	-	-	-	-	-	-	-	-	-	-	150	0	-	-	-	-
Norway	-	-	321	0	-	-	295	0	302	0	363	0	121	0	110	0
Switzerland	307	0	288	0	307	0	294	0	307	0	510	0	139	0	-	-

N_S: number of samples collected at slaughterhouse (fattening pigs, cattle under one year of age, broilers, fattening turkeys) or retail (pig meat, cattle meat, broiler meat and turkey meat); n_{CP}: number of positive isolates

*https://www.eurl-ar.eu/protocols.aspx

† The isolates reported from Ireland for broilers were reported with sample origin European Union.

D.6 Key outcome indicator of pre..0000000.0.0.valence of ESBL- and/or AmpC-producing *Escherichia coli* in food-producing animals, 2014-2022

Table 24: **Key outcome indicator of prevalence of ESBL- and/or AmpC-producing *Escherichia coli* in food-producing animals from 2014-2022, EU MSs and non-MSs.**

Country	Period[(a)]						
	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
Austria	52.1	60.6	57.0	56.2	52.8	18.9	11.7
Belgium	65.7	71.9	68.1	55.6	56.0	76.4	72.0
Bulgaria	64.3	55.3	51.9	55.7	52.2	53.2	62.7
Croatia	40.6	46.7	48.1	60.6	58.7	51.4	59.7
Cyprus	23.9	19.5	7.5	8.5	7.5	27.0	20.8
Czechia	40.5	42.1	37.6	38.0	34.6	36.0	36.9
Denmark	28.3	24.0	24.0	26.0	25.2	2.9	1.6
Estonia	36.7	35.3	38.2	50.5	48.7	49.1	55.6
Finland	6.3	6.3	6.2	6.2	1.7	0.3	1.3
France	39.6	32.6	26.4	22.1	16.9	8.3	7.5
Germany	46.8	47.4	47.0	48.9	46.9	37.5	40.9
Greece	54.3	59.1	42.4	42.5	47.4	53.2	35.1
Hungary	60.6	67.5	65.8	63.4	53.7	34.5	52.0
Iceland	3.1	5.3	4.0	6.4	6.5	0.7	3.3
Ireland	42.3	47.6	40.1	45.7	36.1	16.1	9.1
Italy		52.5	82.3	82.4	68.7	45.9	43.4
Latvia	62.3	60.6	43.6	48.8	51.0	45.3	38.0
Lithuania	49.7	67.9	69.3	55.8	51.8	87.3	60.6
Luxembourg	52.6	40.9	40.7	52.4	52.2	26.1	18.4
Malta		17.9	45.7	66.9	67.2	99.9	46.8
Netherlands	24.7	22.4	17.1	12.4	9.8	9.5	15.7
Norway	10.6	12.8	9.4	12.7	12.4	0.4	0.6
Poland	37.1	43.5	44.5	41.9	34.0	24.4	36.1
Portugal	61.3	56.5	71.4	77.6	65.4	52.6	47.2
Romania	60.8	65.6	66.0	69.4	66.4	61.3	72.5
Slovakia	62.1	66.7	34.9	38.9	72.3	98.6	85.9
Slovenia	71.6	79.0	72.2	75.5	67.5	70.6	48.3
Spain	86.4	85.7	85.7	79.0	73.1	57.1	46.9
Sweden	20.9	22.0	12.4	13.3	12.2	11.0	3.0
Switzerland	30.4	25.1	21.1	19.6	14.3	9.1	4.2

[(a)]Proportions (in percent) of samples from broilers, fattening turkeys, fattening pigs and bovine animals under one year of age weighted by population correction unit that are identified as positive for presumptive ESBL- and/or AmpC- producing *Escherichia coli* in the framework of the specific monitoring of ESBL-/AmpC-/CP-producing *E. coli* according to Commission Implementing Decision 2020/1729/EU.

D.7 Occurrence and prevalence of ESBL-/AmpC- and/or CP-producing Escherichia coli in meat from retail and imported meat sampled at border control posts, 2021-2022

Table 251: Occurrence and prevalence of ESBL-/AmpC- and/or CP-producing *Escherichia coli* in samples from pig meat, cattle meat, broiler meat and turkey meat sampled at retail and border control posts, EU MS and non-MSs, 2021-2022.

Matrix		ESBL and/or AmpC		ESBL			AmpC			ESBL + AmpC			CP		
	NP2	n	P%	n	O%	P%	n	O%	P%	n	O%	P%	n	O%	P%
Pig meat, retail 2021 (N=7,031, 29 RCs)	438	436	6.2	353	80.6	5.0	76	17.4	1.1	7	1.6	0.1	1	0.2	<0.1
Pig meat, BCP 2021 (N=19, 5 RCs)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bovine meat, retail 2021 (N=6,998, 28 RCs)	361	357	5.1	312	86.4	4.5	40	11.1	0.6	5	1.4	0.1	2	0.6	<0.1
Bovine meat, BCP 2021 (N=232, 9 RCs)	1	1	NC	1	100	NC	0	0	0	0	0	0	0	0	0
Broiler meat, retail 2022 (N=6,998, 28 RCs)	1,969	1,933	27.6	1,504	76.4	21.5	388	19.7	5.5	61	3.1	0.9	0	0	0
Broiler meat, BCP 2022 (N=332, 9 RCs)	205	204	NC	177	86.3	NC	28	13.7	NC	1	0.5	NC	0	0	0
Turkey meat, retail 2022 (N=4,050, 24 RCs)	949	941	23.2	822	86.6	20.3	95	10	2.3	36	3.8	0.9	0	0	0
Turkey meat, BCP, 2022 (N=45, 3 RCs)	32	32	NC	26	81.3	NC	6	18.8	NC	0	0	0	0	0	0

ESBL: extended-spectrum beta-lactamase; AmpC: AmpC beta-lactamase; CP: carbapenemase; n: number of isolates with the phenotype; O%: occurrence in percent, P%: prevalence in percent; NP2: Number of isolates tested on Panel two or subjected to whole genome sequencing for identification of ESBL/AmpC/CP-encoding genes; N: total number of samples tested; NC: not calculated as several isolates per positive sample were tested. RCs: reporting countries.

(a) All isolates showing clavulanate synergy with CTX or CAZ or both, suggesting ESBL phenotype, or reported presence of ESBL-encoding gene.

(b) Isolates with cefoxitin resistance, suggesting AmpC phenotype, or reported presence of AmpC-encoding gene.

(c) Isolates showing synergy with CTX or CAZ and cefoxitin resistance, suggesting ESBL- and AmpC enzymes in the same isolates, or both ESBL- and AmpC-encoding genes reported.

(d) Isolates with meropenem resistance or CP-encoding gene reported.

Information regarding the origin of the meat samples collected at BCPs can be found in the respective country datasets available on Zenodo https://doi.org/10.5281/zenodo.10528846