

Supplementary material

Table S1. Sources of clinical breakpoints cited in various studies

	Ceccarelli et al. (2015)	Bier et al. (2015)	Baron et al. (2016)	Baron et al. (2017)	Lepuschitz et al. (2019)
Amoxicillin/Clavulanic acid	CLSI (2010a)	CLSI (2010a)	CLSI (2010a)	CLSI (2015a)	CLSI (2015a)
Amikacin	CLSI (2010a)		CLSI (2010a)	CLSI (2015a)	CLSI (2015a)
Ampicillin	CLSI (2010a)	CLSI (2010a)	CLSI (2010a)	CLSI (2015a)	CLSI (2015a)
Cefepime	CLSI (2010a)				
Cefotaxime	CLSI (2010a)	CLSI (2010a)	CLSI (2010a)	CLSI (2015a)	CLSI (2015a)
Ceftazidime	CLSI (2010a)	CLSI (2010a)			
Chloramphenicol	CLSI (2010a)		CLSI (2010a)	CLSI (2015a)	CLSI (2015a)
Ciprofloxacin	CLSI (2010a)	CLSI (2010a)	CLSI (2010a)	CLSI (2015a)	CLSI (2015a)
Erythromycin			CLSI (2016)		
Florfenicol					
Gentamicin		CLSI (2015b)	CLSI (2010a)	CLSI (2015a)	CLSI (2015a)
Imipenem	CLSI (2010a)	CLSI (2015b)	CLSI (2010a)	CLSI (2015a)	CLSI (2015a)
Meropenem		CLSI (2015b)			
Nalidixic acid	CLSI (2010b)	CLSI (2015b)	CLSI (2016)	CLSI (2016)	CLSI (2018)
Norfloxacin			CLSI (2016)	CLSI (2016)	CLSI (2018)
Streptomycin	CLSI (2010b)			CLSI (2016)	CLSI (2018)
Tetracycline	CLSI (2010a)	CLSI (2010a)	CLSI (2010a)	CLSI (2015a)	CLSI (2015a)
Trimethoprim		CLSI (2015b)			CLSI (2018)
Trimethoprim-sulfamethoxazole	CLSI (2010a)	CLSI (2010a)	CLSI (2010a)	CLSI (2015a)	CLSI (2015a)

Table S2. Suppliers of discs used by each laboratory. Oxoid discs obtained from Thermo Scientific, Landsmeer, the Netherlands. Mast discs obtained from Mast Group, Bootle, UK. Biorad discs obtained from Bio-Rad, Marnes-la-Coquette, France. AGES: Institute for Medical Microbiology and Hygiene at the Austrian Federal Agency for Health and Food Safety, Vienna, Austria; Anses: The Mycoplasmology-Bacteriology and Antimicrobial Resistance Unit of Ploufragan-Plouzané-Niort Laboratory of the French Agency for Food, Environmental and Occupational Health & Safety, France; ICC: Inter-University Cooperation Centre Water & Health at Karl Landsteiner University of Health Sciences, Division Water Quality & Health, Krems, Austria; BfR: the Consultant Laboratory for *Vibrio* spp. in food hosted at the German Federal Institute for Risk Assessment, Berlin, Germany.

	AGES	Anses	BfR	ICC
Amoxicillin/ Clavulanic acid (20/10 µg)	Oxoid	Biorad	Oxoid	Oxoid
Amikacin (30 µg)	Oxoid	Biorad	Oxoid	Oxoid
Ampicillin (10 µg)	Oxoid	Biorad	Oxoid	Oxoid
Cefepime (30 µg)	Oxoid	Biorad	Oxoid	Oxoid
Chloramphenicol (30 µg)	Oxoid	Mast	Oxoid	Oxoid
Ciprofloxacin (5 µg)	Oxoid	Mast	Oxoid	Oxoid
Cefotaxime (30 µg)	Oxoid	Mast	Oxoid	Oxoid
Ceftazidime (30 µg)	Oxoid	Biorad	Oxoid	Oxoid
Erythromycin (15 µg)	Oxoid	Biorad	Oxoid	Oxoid
Florfenicol (30 µg)	Oxoid	Mast	Oxoid	Oxoid
Gentamicin (10 µg)	Oxoid	Biorad	Oxoid	Oxoid
Imipenem (10 µg)	Oxoid	Biorad	Oxoid	Oxoid
Meropenem (10 µg)	Oxoid	Biorad	Oxoid	Oxoid
Nalidixic acid (30 µg)	Oxoid	Mast	Oxoid	Oxoid
Norfloxacin (10 µg)	Oxoid	Biorad	Oxoid	Oxoid
Streptomycin (10 µg)	Oxoid	Biorad	Oxoid	Oxoid
Tetracycline (30 µg)	Oxoid	Biorad	Oxoid	Oxoid
Trimethoprim (5 µg)	Oxoid	Biorad	Oxoid	Oxoid
Trimethoprim-sulfamethoxazole (1.25/23.75 µg)	Oxoid	Oxoid	Oxoid	Oxoid

Table S3 (individual parts S3.1–S3.19 on subsequent pages). Raw disc zone data for each laboratory (abbreviations as in Table S2) and for multi-laboratory aggregations. Columns shaded in grey indicate zone sizes for isolates that would be categorised as WT by the application of the CO_{WT} calculated from the aggregations or censored aggregations of the data from the participating laboratories. Zone sizes in red indicate data sets from individual laboratories which because of their excessive SD values (>3.39 mm) were excluded from censored aggregations.

Table S3.1. Amoxicillin-clavulanate (20/10 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19	10	1			11
20	9	5		1	15
21	7	19	8	13	47
22	4	10	23	6	43
23		4	9	5	18
24			8	1	9
25			1	1	2
26					0
27				1	1
28				1	1
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	18	19	19	14	18
SD	1.1	0.94	1.5	2.9	1.5
<i>E. coli</i>	Acceptable range 17–22 mm				
ATCC 35218	19	21	21	20	

Table S3.2. Amikacin (30 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19	4				4
20	15		6	6	27
21	8	9	8	15	40
22	2	18	26	7	53
23	1	9	5	1	16
24		3	4		7
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	18	20	18	19	18
SD	0.9	1.5	1.3	0.8	1.2
<i>E. coli</i>	Acceptable range 19–26 mm				
ATCC 25922	19	21	21	20	

Table S3.3. Ampicillin (10 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6			1		1
7					
8					
9			1		1
10			1		1
11			4		4
12					
13			1		1
14					
15					
16					
17					
18					
19	12				12
20	12			8	20
21	4	1		12	17
22	2	4	3	5	14
23		10	9		19
24		11	15	2	28
25		7	11	1	19
26		5	1	1	7
27		1	2		3
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	18	20	21	16	19
SD	1.0	1.5	1.0	2.2	1.6
<i>E. coli</i>	Acceptable range 15–22 mm				
ATCC 25922	17	17	15	18	

Table S3.4. Cefepime (30 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27		1			1
28	4	1	1	1	7
29	7		1		8
30	4	5	6	6	21
31	3	6	9	4	22
32	6	11	11	13	41
33	5	5	9	5	24
34	1	6	8		15
35		1	2		3
36		1	1		2
37		2			2
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	25	26	28	29	28
SD	2.4	2.2	1.6	0.9	1.5
<i>E. coli</i>	Acceptable range 31–37 mm				
ATCC 25922	32	37		33	

Table S3.5. Cefotaxime (30 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31				1	1
32	1				1
33	3				3
34	1		2	4	7
35	5			2	7
36	6	3	3	11	23
37	4	4	4	3	15
38	6	10	11	6	33
39	2	7	8		17
40	2	7	11	2	22
41		6	6		12
42		2	3		5
43			1		1
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	32	35	34	31	31
SD	2.0	1.6	1.8	2.0	2.4
<i>E. coli</i>	Acceptable range 29–35 mm				
ATCC 25922	30	35	34	33	

Table S3.6. Ceftazidime (30 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25	2		3		5
26	2	1	3	1	7
27	6	3	8	1	18
28	4	6	12	3	25
29	6	17	10	8	41
30	6	6	7	12	31
31	1	4	4	1	10
32	3	1	1	3	8
33		1			1
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	23	26	24	25	24
SD	2.2	1.4	1.7	1.6	2.3
<i>E. coli</i>	Acceptable range 25–32 mm				
ATCC 25922	23	24		29	

Table S3.7. Chloramphenicol (30 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26	1				1
27	3				3
28	3	2	7		12
29	7	8	9		24
30	6	10	3	15	34
31	4	9	5	7	25
32	3	7	8	5	23
33	3		3	1	7
34		3	12	1	16
35			1		1
36			1		1
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	24	25	30	28	24
SD	2.3	2.0	1.3	1.1	2.5
<i>E. coli</i>	Acceptable range 21–27 mm				
ATCC 2592	25	22	27	25	

Table S3.8. Ciprofloxacin (5 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30			2		2
31			8		8
32	3		7	2	12
33	2		2		4
34	2	4	4	5	15
35	4	2	8	1	15
36	6	5	8	14	33
37	2	9	2		13
38	6	10	4	4	24
39	2	4	3		9
40	3	4	1	3	11
41		1			1
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	31	33	27	27	31
SD	2.3	1.8	2.9	2.9	2.3
<i>E. coli</i>	Acceptable range 29–38 mm				
ATCC 2592	32	35	37	36	

Table S3.9. Erythromycin (15 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16		2			2
17				1	1
18		1	10		11
19	8	3	15	4	30
20	7	6	13	8	34
21	6	17	6	10	39
22	3	2	3	5	13
23	5	5	2	1	13
24		2			2
25		1			1
26					
27	1				1
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
COwt	14	17	15	18	16
SD	2.4	1.9	1.6	1.1	1.7
<i>S. aureus</i>	Acceptable range 22–30 mm				
ATCC 25923	28	27	28,30,30	29	

Table S3.10. Florfenicol

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28	1		1		2
29	2	1	4		10
30	3	7	7	10	27
31	10	12	15	6	51
32	6	12	7	12	39
33	3	5	7		20
34	2	1	6	1	10
35	2		1		3
36		1			2
37					
38	1				1
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	25	28	26	26	27
SD	2.4	1.2	2.1	2.1	1.6
<i>E. coli</i>	Acceptable range 22–28 mm				
ATCC 25922	24	22		23	

Table S3.11. Gentamicin (10 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19	1	1		4	6
20	8	5		18	31
21	17	9		7	33
22	4	11	3		18
23		6	14		20
24		3	23		26
25		4	7		11
26			2		2
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	19	17	21	18	16
SD	0.8	1.9	0.9	0.6	2.2
<i>E. coli</i>	Acceptable range 19–26 mm				
ATCC 25922	20	24	19	22	

Table S3.12. Imipenem (10 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22				1	1
23	2				2
24	10	1	3	8	22
25	10	4	12	13	39
26	5	11	17	3	36
27	3	16	10	2	31
28		6	5		11
29			2		2
30		1		2	3
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	22	24	23	18	23
SD	1.2	1.0	1.3	2.6	1.3
<i>P. aeruginosa</i>	Acceptable range 20–28 mm				
ATCC 27853	23	24	23,25,28	22	

Table S3.13. Meropenem (10 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24		1			1
25	3	1			4
26	8	2		1	11
27	9	13	7	13	42
28	8	15	38	11	72
29	2	4	3	3	12
30		2	1	1	4
31		1			1
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
9COWT	24	24	26	26	25
SD	1.1	1.3	0.9	0.9	0.8
<i>P. aeruginosa</i> ATCC 27853	Acceptable range 27–33 mm				
	31	29	30,32,33	33	

Table S3.14. Nalidixic acid (30 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28			1		1
29					
30	2	6	4	1	13
31	1	3	5	1	10
32	7	7	13	5	32
33	8	12	8	3	31
34	8	8	10	16	42
35	3	2	5	1	11
36	1	1	1	2	5
37			2		2
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	30	26	29	30	29
SD	1.4	1.3	1.7	1.5	1.4
<i>E. coli</i>	Acceptable range 22–28 mm				
ATCC 25922	28	25	26	28	

Table S3.15. Norfloxacin (10 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29			1		1
30			4	1	5
31	1		4		5
32	3		2	17	22
33	5	1	7	2	15
34	8	7	10	6	31
35	7	7	9	1	24
36	3	7	8	2	20
37	1	10	1		12
38	2	4	1		7
39			2		2
40		3			3
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	29	29	30	28	28
SD	2.1	2.4	1.9	1.9	2.4
<i>E. coli</i>	Acceptable range 28–35 mm				
ATCC 25922	30	35	34	32	

Table S3.16. Streptomycin (10 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13	4	5	3	1	13
14	14	6	15	12	47
15	7	19	13	11	50
16	4	5	17	3	29
17	1	1	1	2	5
18		2			2
19		1			1
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	11	9	11	13	13
SD	1.2	1.9	1.5	1.0	1.0
<i>E. coli</i>	Acceptable range 12–20 mm				
ATCC 25922	16	17	19	18	

Table S3.17. Tetracycline (30 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24			1	2	3
25	1		1	4	6
26	2		6	8	16
27	9	7	6	7	29
28	9	8	9	8	34
29	8	8	7		23
30	1	11	9		21
31		1	7		8
32		4	2		6
33					
34					
35			1		1
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	25	23	25	22	23
SD	1.2	2.0	1.8	1.6	1.9
<i>E. coli</i>	Acceptable range 18–25 mm				
ATCC 25922	23	23	22	23	

Table S3.18. Trimethoprim (5 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Censored aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22	1				1
23		4			
24	4	5		1	5
25	6	9	8	3	17
26	11	4	39	9	59
27	5	7	2	9	16
28	2	1		5	7
29	1	3		1	2
30		2		1	1
31		1			
32		1			
33		1			
34		1			
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
COWT	23	15	25	23	23
SD	1.1	4.1	1.8	1.3	1.3
<i>E. coli</i>	Acceptable range 21–28 mm				
ATCC 25922	26	23	24	23	

As its SD was excessive, the data from Anses was not included in the censored aggregation

Table S3.19. Trimethoprim-sulfamethoxazole (1.25/23.75 µg)

Zones (mm)	AGES	Anses	BfR	ICC	Censored aggregation
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25		1	4		5
26	4	4	1		9
27	8	9	7	4	24
28	13	5	12	4	30
29	5	5	8	4	18
30		10	8	15	18
31		4	4	1	8
32		1	2	1	3
33			2		2
34			1		1
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
CO _{WT}	25	24	23	18	24
SD	0.9	1.7	2.3	4.1	1.9
<i>E. coli</i>	Acceptable range 23–29 mm				
ATCC 25922	26	26	27	28	

As its SD was excessive, the data from ICC was not included in the censored aggregation

LITERATURE CITED

- Baron S, Lesne J, Jouy E, Larvor E and others (2016) Antimicrobial susceptibility of autochthonous aquatic *Vibrio cholerae* in Haiti. *Front Microbiol* 7:1671
- Baron S, Larvor E, Chevalier S, Jouy E, Kempf I, Granier SA, Lesne J (2017) Antimicrobial susceptibility among urban wastewater and wild shellfish isolates of non-O1/non-O139 *Vibrio cholerae* from La Rance Estuary (Brittany, France). *Front Microbiol* 8:1637
- Bier N, Schwartz K, Guerra B, Strauch E (2015) Survey on antimicrobial resistance patterns in *Vibrio vulnificus* and *Vibrio cholerae* non-O1/non-O139 in Germany reveals carbapenemase-producing *Vibrio cholerae* in coastal waters. *Front Microbiol* 6:1179
- Ceccarelli D, Chen A, Hasan NA, Rashed SM, Huq A, Colwell RR (2015) Non-O1/non-O139 *Vibrio cholerae* carrying multiple virulence factors and *V. cholerae* O1 in the Chesapeake Bay, Maryland. *Appl Environ Microbiol* 81:1909–1918
- CLSI (2010a) Methods for antimicrobial dilution and disk susceptibility testing of infrequently isolated or fastidious bacteria, CLSI guideline M45, 2nd edn. Clinical and Laboratory Standards Institute, Wayne, PA
- CLSI (2010b) Performance standards for antimicrobial susceptibility testing, twentieth informational supplement. M100-S20. Clinical and Laboratory Standards Institute, Wayne, PA
- CLSI (2015a) Methods for antimicrobial dilution and disc susceptibility testing of infrequently isolated of fastidious bacteria. CLSI guideline M45, 3rd edn. Clinical and Laboratory Standards Institute, Wayne, PA
- CLSI (2015b) Performance standards for antimicrobial susceptibility testing, twenty-fifth informational supplement M100-S25. Clinical and Laboratory Standards Institute, Wayne, PA
- CLSI (2016) Performance standards for antimicrobial susceptibility testing, twenty-sixth informational supplement M100-S26. Clinical and Laboratory Standards Institute, Wayne, PA
- CLSI (2018) Performance standards for antimicrobial susceptibility testing, twenty-eighth informational supplement M100-S28. Clinical and Laboratory Standards Institute, Wayne, PA
- Lepuschitz S, Baron S, Larvor E, Granier SA and others (2019) Phenotypic and genotypic antimicrobial resistance traits of *Vibrio cholerae* non-O1/non-O139 isolated from a large Austrian lake frequently associated with cases of human infection. *Front Microbiol* 10:2600