European Committee on Antimicrobial Susceptibility Testing

Breakpoint tables for interpretation of MICs and zone diameters

Version 3.1, valid from 2013-02-11

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European Committee on Antimicrobial Susceptibility Testing

Breakpoint tables for interpretation of MICs and zone diameters

Version 3.1, valid from 2013-02-11

Notes

1. The EUCAST tables of clinical breakpoints contain clinical MIC breakpoints (determined over the period 2002-2012) and their inhibition zone diameter correlates. The EUCAST breakpoint table version 3.1 includes corrected typographical errors, clarifications, breakpoints for new organisms, revised MIC breakpoints and revised and new zone diameter breakpoints. Changes are best seen on screen or on a colour printout since cells containing a change are yellow.

2. PK/PD (Non-species-related) breakpoints are listed separately on the last page.

3. Numbered footnotes relate to MIC breakpoints. Lettered footnotes relate to zone diameter breakpoints.

4. Highlighted antimicrobial names link to EUCAST rationale documents. Highlighted MIC breakpoints and zone diameter breakpoints link to EUCAST MIC and zone diameter distributions, respectively.

5. One version of the document is released as an unprotected Excel file to enable users to alter the list of agents to suit the range of agents tested locally. The content of single cells cannot be changed.
Hide lines by right-clicking on the line number and choosing "hide".
Hide columns by right-clicking on the column letter and choosing "hide".

6. A zone diameter breakpoint of "S ≥ 50 mm" is an arbitrary "off scale" zone diameter breakpoint corresponding to MIC breakpoint situations where wild type isolates are categorised as intermediate (*i.e.* no fully susceptible isolates exist).

7. In order to simplify the EUCAST tables, the intermediate category is not listed. It is interpreted as the values between the S and the R breakpoints. For example, for MIC breakpoints listed as S ≤ 1 mg/L and R > 8 mg/L, the intermediate category is 2-8 (technically >1-8) mg/L, and for zone diameter breakpoints listed as S ≥ 22 mm and R < 18 mm, the intermediate category is 18-21 mm.

8. For *Stenotrophomonas maltophilia* with trimethoprim-sulfamethoxazole, *S. aureus* with benzylpenicillin and enterococci with vancomycin, it is crucial to follow specific reading instructions for correct interpretation of the disk diffusion test. For these, pictures with reading examples are included at the end of the corresponding breakpoint table. For general and other specific reading instructions, please refer to the EUCAST Reading Guide.

9. For cefuroxime and fosfomycin there are breakpoints for intravenous and oral administration.

"-" indicates that susceptibility testing is not recommended as the species is a poor target for therapy with the drug. Isolates may be reported as R without prior testing.
"IE" indicates that there is insufficient evidence that the species in question is a good target for therapy with the drug. An MIC with a comment but without an accompanying S, I or R categorisation may be reported.
NA = Not Applicable
IP = In Preparation

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Breakpoint tables for interpretation of MICs and zone diameters

Version 3.1, valid from 2013-02-11

Version 3.1, 2013-02-11	Changes (cells containing a change, a deletion or an addition) from v 3.0 are marked blue
Haemophilus influenzae	• Supplementary table revised. "Determine the MIC of the agent considered for clinical use and interpret according to the clinical breakpoints" changed to "Test susceptibility to the beta-lactam agent intended for clinical use".

Version 3.0, 2013-01-01	Changes (cells containing a change, a deletion or an addition) from v 2.0 are marked yellow
All	• New breakpoints: Ceftaroline. • Cefuroxime changed to cefuroxime iv. Cefuroxime axetil changed to cefuroxime oral. • Fosfomycin-trometamol changed to fosfomycin oral. • Clarification regarding zone diameter breakpoints for screening disks. Resistant breakpoint expressed as Note when further testing is required. • Breakpoints for organisms with few options are sorted into antibiotic groups. • Information on testing conditions added to organisms with no disk diffusion criteria.
Enterobacteriaceae	• Revised breakpoints: Piperacillin, cefalexin and aztreonam (zone).
***Pseudomonas* spp.**	• Revised comments: Piperacillin-tazobactam and ticarcillin-clavulanate (typos corrected).
Stenotrophomonas maltophilia	• Pictures with reading examples for trimethoprim-sulfamethoxazole disk added.
***Staphylococcus* spp.**	• Clarification regarding testing of benzylpenicillin added in antibiotic agent column. • Clarification regarding *S. saprophyticus* added to ampicillin and cefoxitin in antibiotic agent column. • Pictures with reading examples for *S. aureus* with benzylpenicillin disk added. • Revised comments: Penicillins (*S. saprohyticus* added), ampicillin, cephalosporins (ceftaroline added), cefoxitin, ceftaroline (new), fluoroquinolones (norfloxacin screen) and linezolid.
***Enterococcus* spp.**	• Specific instructions for incubation and reading when testing glycopeptides added. • Clarification regarding tests for high-level resistance added to gentamicin and streptomycin in antibiotic agent column. • Revised breakpoints: Amikacin, netilmicin and tobramycin (IE replaced with Note). • Revised comments: Ampicillin, aminoglycosides (clarification regarding high-level resistance), teicoplanin (comment removed) and vancomycin. • Pictures with reading examples for enterococci with vancomycin disk added.
Streptococcus groups A, B, C and G	• Revised breakpoints: Telithromycin and chloramphenicol (zone). • Revised comments: Fluoroquinolones (norfloxacin screen).
Streptococcus pneumoniae	• Revised breakpoints: Ampicillin (zone diameter breakpoints removed). Zone diameter breakpoints revised for ciprofloxacin, levofloxacin, ofloxacin, teicoplanin, telithromycin and tetracycline. • Revised comments: Penicillins (several comments relating to oxacilllin screen), cephalosporins Note A (ceftaroline added and oxacillin screen update), carbapenems Note A (oxacillin screen update) and fluoroquinolones (norfloxacin screen). • Supplementary table for interpretation of the oxacillin disk screen added.
Viridans group streptococci	• Revised breakpoints: Carbapenems (zone diameter breakpoints replaced with Note). • Revised comments: Benzylpenicillin (screen), cephalosporins Note A and carbapenems Note A (related to benzylpenicillin screen).
Haemophilus influenzae	• General information for *Haemophilus* spp. added. • Revised breakpoints: Amoxicillin-clavulanate (zone) and cefaclor (zone diameter breakpoints replaced with Note). • Revised comments: Benzylpenicillin (screen), penicillins Note 1, cephalosporins Note B, carbapenems Note A (benzylpenicillin screen update) and fluoroquinolones (nalidixic acid screen). • Supplementary table for interpretation of the benzylpenicillin disk screen added.
Moraxella catarrhalis	• Revised breakpoints: Cefaclor (zone diameter breakpoints replaced with Note). • Revised comments: Fluoroquinolones (nalidixic acid screen).
Neisseria gonorrhoeae	• Revised breakpoints: Minocycline (replaced with IE). • Revised comments: Cefixime (removed).
Pasteurella multocida	• New table. All breakpoints and comments new.
Campylobacter jejuni* and *coli	• New table. All breakpoints and comments new.
PK/PD (Non-species related) breakpoints	• New title. • General information regarding the use of PK/PD breakpoints added. • Revised comments: Ceftaroline (new).

Enterobacteriaceae

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Mueller-Hinton agar
Inoculum: McFarland 0.5
Incubation: Air, 35±1ºC, 18±2h
Reading: Read zone edges as the point showing no growth viewed from the back of the plate against a dark background illuminated with reflected light.
Quality control: *Escherichia coli* ATCC 25922

Penicillins[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Benzylpenicillin	-	-		-	-	
Ampicillin	8[1]	8	10	14[A,B]	14[B]	**1/A**. Wild type Enterobacteriaceae are categorised as susceptible to aminopenicillins. Some countries prefer to categorise wild type isolates of *E. coli* and *P. mirabilis* as intermediate. When this is the case, use the MIC breakpoint S ≤ 0.5 mg/L and the corresponding zone diameter breakpoint S ≥ 50 mm. **B**. Ignore growth that may appear as a thin inner zone on some batches of Mueller-Hinton agars.
Ampicillin-sulbactam	8[1,2]	8[2]	10-10	14[A,B]	14[B]	**2.** For susceptibility testing purposes, the concentration of sulbactam is fixed at 4 mg/L.
Amoxicillin	8[1]	8	-	Note[C]	Note[C]	**C.** Susceptibility inferred from ampicillin.
Amoxicillin-clavulanate	8[1,3]	8[3]	20-10	17[A,B]	17[B]	**3.** For susceptibility testing purposes, the concentration of clavulanate is fixed at 2 mg/L.
Piperacillin	8	16	30	20	17	
Piperacillin-tazobactam	8[4]	16[4]	30-6	20	17	**4.** For susceptibility testing purposes, the concentration of tazobactam is fixed at 4 mg/L.
Ticarcillin	8	16	75	23	23	
Ticarcillin-clavulanate	8[3]	16[3]	75-10	23	23	
Phenoxymethylpenicillin	-	-		-	-	
Oxacillin	-	-		-	-	
Cloxacillin	-	-		-	-	
Dicloxacillin	-	-		-	-	
Flucloxacillin	-	-		-	-	
Mecillinam (uncomplicated UTI only)	8[5]	8[5]	10	15[E,F]	15[E, F]	**5/E**. Mecillinam (pivmecillinam) breakpoints relate to *E. coli, Klebsiella* spp. and *P. mirabilis* only. **F**. Ignore isolated colonies within the inhibition zone for *E. coli.*

Cephalosporins[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. The cephalosporin breakpoints for Enterobacteriaceae will detect all clinically important resistance mechanisms (including ESBL and plasmid mediated AmpC). Some isolates that produce beta-lactamases are susceptible or intermediate to 3rd or 4th generation cephalosporins with these breakpoints and should be reported as tested, *i.e.* the presence or absence of an ESBL does not in itself influence the categorisation of susceptibility. In many areas, ESBL detection and characterisation is recommended or mandatory for infection control purposes.
Cefaclor	-	-		-	-	
Cefadroxil (uncomplicated UTI only)	16	16	**30**	12	12	
Cefalexin (uncomplicated UTI only)	16	16	**30**	14	14	
Cefazolin	-	-		-	-	
Cefepime	1	4	**30**	24	21	
Cefixime (uncomplicated UTI only)	1	1	**5**	17	17	
Cefotaxime	1	2	**5**	20	17	
Cefoxitin (screen)[2]	NA	NA	**30**	19	19	**2.** The cefoxitin ECOFF (WT ≤ 8 mg/L) has a high sensitivity, but poor specificity for identification of AmpC-producing Enterobacteriaceae as this antibiotic is also affected by permeability alterations and some carbapenemases. Classical non-AmpC producers are wild type, whereas plasmid AmpC producers or chromosomal AmpC hyperproducers are non-wild type.
Cefpodoxime (uncomplicated UTI only)	1	1	**10**	21	21	
Ceftaroline	0.5	0.5	**5**	23	23	
Ceftazidime	1	4	**10**	22	19	
Ceftibuten (UTI only)	1	1	**30**	23	23	
Ceftriaxone	1	2	**30**	23	20	
Cefuroxime iv	8[3]	8	**30**	18	18	**3.** The breakpoint relates to a dosage of 1.5 g x 3 and to *E. coli, P. mirabilis* and *Klebsiella* spp. only.
Cefuroxime oral (uncomplicated UTI only)	8	8	**30**	18	18	

Carbapenems[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. The carbapenem breakpoints for Enterobacteriaceae will detect all clinically important resistance mechanisms (including the majority of carbapenemases). Some isolates that produce carbapenemase are categorised as susceptible with these breakpoints and should be reported as tested, *i.e.* the presence or absence of a carbapenemase does not in itself influence the categorisation of susceptibility. In many areas, carbapenemase detection and characterisation is recommended or mandatory for infection control purposes.
Doripenem	1	4	**10**	24	18	
Ertapenem	0.5	1	**10**	25	22	
Imipenem[2]	2	8	**10**	22	16	**2.** Low-level resistance is common in *Morganella* spp., *Proteus* spp. and *Providencia* spp.
Meropenem	2	8	**10**	22	16	

Monobactams	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Aztreonam[1]	1	4	**30**	24	21	**1.** The aztreonam breakpoints for Enterobacteriaceae will detect clinically important resistance mechanisms (including ESBL). Some isolates that produce beta-lactamases are susceptible or intermediate to 3rd or 4th generation cephalosporins with these breakpoints and should be reported as tested, *i.e.* the presence or absence of an ESBL does not in itself influence the categorisation of susceptibility. In many areas, ESBL detection and characterisation is recommended or mandatory for infection control purposes.

Fluoroquinolones	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Ciprofloxacin[1]	0.5	1	**5**	22	19	**1**. *Salmonella* spp. - there is clinical evidence for ciprofloxacin to indicate a poor response in systemic infections caused by *Salmonella spp.* with low-level fluoroquinolone resistance (MIC>0.06 mg/L). The available data relate mainly to *S. typhi* but there are also case reports of poor response with other *Salmonella* species.
Levofloxacin	1	2	**5**	22	19	
Moxifloxacin	0.5	1	**5**	20	17	
Nalidixic acid (screen)	NA	NA		NA	NA	
Norfloxacin	0.5	1	**10**	22	19	
Ofloxacin	0.5	1	**5**	22	19	

Aminoglycosides[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. Aminoglycoside breakpoints are based on once-daily administration of high aminoglycoside dosages. Most often aminoglycosides are given in combination with beta-lactam agents.
Amikacin	8	16	**30**	16	13	
Gentamicin	2	4	**10**	17	14	
Netilmicin	2	4	**10**	15	12	
Tobramycin	2	4	**10**	17	14	

Glycopeptides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R>		S ≥	R <	
Teicoplanin	-	-		-	-	
Telavancin	-	-		-	-	
Vancomycin	-	-		-	-	

Macrolides, lincosamides and streptogramins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Azithromycin[1]	-	-		-	-	**1.** Azithromycin has been used in the treatment of infections with *Salmonella typhi* (MIC ≤16 mg/L for wild type isolates) and *Shigella* spp.
Clarithromycin	-	-		-	-	
Erythromycin[1]	-	-		-	-	
Roxithromycin	-	-		-	-	
Telithromycin	-	-		-	-	
Clindamycin	-	-		-	-	
Quinupristin-dalfopristin	-	-		-	-	

Tetracyclines	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doxycycline	-	-		-	-	
Minocycline	-	-		-	-	
Tetracycline	-	-		-	-	
Tigecycline[1]	1	2	15	18[A]	15[A]	**1**. Tigecycline has decreased activity against *Morganella spp., Proteus spp. and Providencia spp.* **A.** Zone diameter breakpoints validated for *E. coli* only. For other Enterobacteriaceae, use an MIC method.

Miscellaneous agents	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Chloramphenicol	8	8	30	17	17	
Colistin	2	2		Note[A]	Note[A]	**A.** Use an MIC method.
Daptomycin	-	-		-	-	
Fosfomycin iv	32	32		-	-	
Fosfomycin oral (uncomplicated UTI only)	32	32		-	-	
Fusidic acid	-	-		-	-	
Linezolid	-	-		-	-	
Metronidazole	-	-		-	-	
Mupirocin	-	-		-	-	
Nitrofurantoin (uncomplicated UTI only)	64[1]	64[1]	100	11[B]	11[B]	**1/B**. Breakpoints apply to *E. coli* only.
Rifampicin	-	-		-	-	
Spectinomycin	-	-		-	-	
Trimethoprim (uncomplicated UTI only)	2	4	5	18	15	
Trimethoprim-sulfamethoxazole[2]	2	4	1.25-23.75	16	13	**2**. Trimethoprim:sulfamethoxazole in the ratio 1:19. Breakpoints are expressed as the trimethoprim concentration.

Pseudomonas spp.

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Mueller-Hinton agar
Inoculum: McFarland 0.5
Incubation: Air, 35±1ºC, 18±2h
Reading: Read zone edges as the point showing no growth viewed from the back of the plate against a dark background illuminated with reflected light.
Quality control: *Pseudomonas aeruginosa* ATCC 27853

Penicillins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Benzylpenicillin	-	-		-	-	
Ampicillin	-	-		-	-	
Ampicillin-sulbactam	-	-		-	-	
Amoxicillin	-	-		-	-	
Amoxicillin-clavulanate	-	-		-	-	
Piperacillin[1]	16	16	30	19	19	**1.** Breakpoints are based on high dose therapy (with or without tazobactam, 4 g x 4).
Piperacillin-tazobactam[1]	16[2]	16[2]	30-6	19	19	**2.** For susceptibility testing purposes, the concentration of tazobactam is fixed at 4 mg/L.
Ticarcillin[3]	16	16	75	17	17	**3.** Breakpoints are based on high dose therapy (with or without clavulanate, 3 g x 4).
Ticarcillin-clavulanate[3]	16[4]	16[4]	75-10	17	17	**4.** For susceptibility testing purposes, the concentration of clavulanate is fixed at 2 mg/L.
Phenoxymethylpenicillin	-	-		-	-	
Oxacillin	-	-		-	-	
Cloxacillin	-	-		-	-	
Dicloxacillin	-	-		-	-	
Flucloxacillin	-	-		-	-	
Mecillinam (uncomplicated UTI only)	-	-		-	-	

Cephalosporins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Cefaclor	-	-		-	-	
Cefadroxil	-	-		-	-	
Cefalexin	-	-		-	-	
Cefazolin	-	-		-	-	
Cefepime	8[1]	8	30	18	18	**1.** Breakpoints relate to high dose therapy (2 g x 3).
Cefixime	-	-		-	-	
Cefotaxime	-	-		-	-	
Cefoxitin	NA	NA		NA	NA	
Cefpodoxime	-	-		-	-	
Ceftaroline	-	-		-	-	
Ceftazidime	8[1]	8	10	16	16	
Ceftibuten	-	-		-	-	
Ceftriaxone	-	-		-	-	
Cefuroxime iv	-	-		-	-	
Cefuroxime oral	-	-		-	-	

Carbapenems	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doripenem	1	4	10	25	19	
Ertapenem	-	-		-	-	
Imipenem	4[1]	8	10	20	17	**1.** Breakpoints relate to high dose, frequent therapy (1 g x 4).
Meropenem	2	8	10	24	18	

Monobactams	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Aztreonam	1	16[1]	30	50	16	**1.** The resistant breakpoint relates to high dose therapy. The susceptible breakpoint is set to ensure that wild type isolates are reported intermediate.

Fluoroquinolones	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Ciprofloxacin	0.5	1	5	25	22	
Levofloxacin	1	2	5	20	17	
Moxifloxacin	-	-		-	-	
Nalidixic acid (screen)	NA	NA		NA	NA	
Norfloxacin	-	-		-	-	
Ofloxacin	-	-		-	-	

Aminoglycosides[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. Aminoglycoside breakpoints are based on once-daily administration of high aminoglycoside dosages. Most often aminoglycosides are given in combination with beta-lactam agents.
Amikacin	8	16	30	18	15	
Gentamicin	4	4	10	15	15	
Netilmicin	4	4	10	12	12	
Tobramycin	4	4	10	16	16	

Glycopeptides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Teicoplanin	-	-		-	-	
Telavancin	-	-		-	-	
Vancomycin	-	-		-	-	

Macrolides, lincosamides and streptogramins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Azithromycin	-	-		-	-	
Clarithromycin	-	-		-	-	
Erythromycin	-	-		-	-	
Roxithromycin	-	-		-	-	
Telithromycin	-	-		-	-	
Clindamycin	-	-		-	-	
Quinupristin-dalfopristin	-	-		-	-	

Tetracyclines	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doxycycline	-	-		-	-	
Minocycline	-	-		-	-	
Tetracycline	-	-		-	-	
Tigecycline	-	-		-	-	

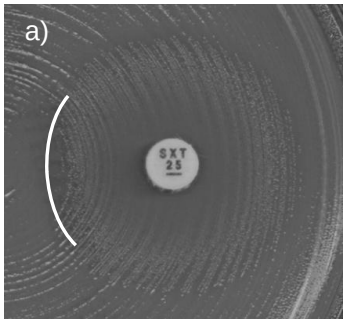
Miscellaneous	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Chloramphenicol	-	-		-	-	
Colistin	4	4		Note[A]	Note[A]	**A.** Use an MIC method.
Daptomycin	-	-		-	-	
Fosfomycin iv[1]	-	-		-	-	**1.** Anecdotal evidence suggests that infections caused by wild type isolates (ECOFF: WT ≤ 128 mg/L) may be treated with combinations of fosfomycin and other agents.
Fosfomycin oral	-	-		-	-	
Fusidic acid	-	-		-	-	
Linezolid	-	-		-	-	
Metronidazole	-	-		-	-	
Mupirocin	-	-		-	-	
Nitrofurantoin (uncomplicated UTI only)	-	-		-	-	
Rifampicin	-	-		-	-	
Spectinomycin	-	-		-	-	
Trimethoprim (uncomplicated UTI only)	-	-		-	-	
Trimethoprim-sulfamethoxazole	-	-		-	-	

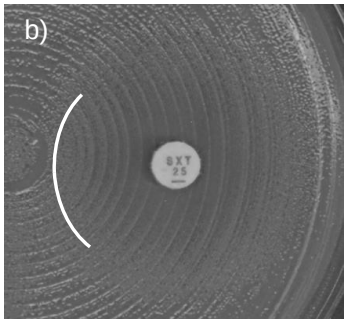
Stenotrophomonas maltophilia

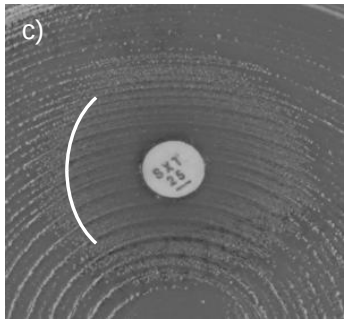
EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

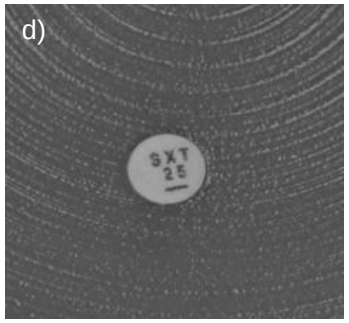
Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Mueller-Hinton agar
Inoculum: McFarland 0.5
Incubation: Air, 35±1ºC, 18±2h
Reading: Read zone edges as the point showing no growth viewed from the back of the plate against a dark background illuminated with reflected light.
Quality control: *Escherichia coli* ATCC 25922

Miscellaneous agents	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Trimethoprim-sulfamethoxazole[1]	4	4	**1.25-23.75**	16[A]	16[A]	**1.** Trimethoprim:sulfamethoxazole in the ratio 1:19. Breakpoints are expressed as the trimethoprim concentration. **A.** Ignore haze or fine growth within the inhibition zone (see pictures below).









Examples of inhibition zones for *Stenotrophomonas maltophilia* with trimethoprim-sulfamethoxazole.
a-c) An outer zone can be seen. Report susceptible if the zone diameter ≥ 16 mm.
d) Growth up to the disk **and** no sign of inhibition zone. Report resistant.

Acinetobacter spp.

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Mueller-Hinton agar
Inoculum: McFarland 0.5
Incubation: Air, 35±1ºC, 18±2h
Reading: Read zone edges as the point showing no growth viewed from the back of the plate against a dark background illuminated with reflected light.
Quality control: *Pseudomonas aeruginosa* ATCC 27853

Penicillins[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. Susceptibility testing of *Acinetobacter* spp. to penicillins is unreliable. In most instances *Acinetobacter* spp. are resistant to penicillins.
Benzylpenicillin	-	-		-	-	
Ampicillin	-	-		-	-	
Ampicillin-sulbactam	IE	IE		IE	IE	
Amoxicillin	-	-		-	-	
Amoxicillin-clavulanate	-	-		-	-	
Piperacillin	IE	IE		IE	IE	
Piperacillin-tazobactam	IE	IE		IE	IE	
Ticarcillin	IE	IE		IE	IE	
Ticarcillin-clavulanate	IE	IE		IE	IE	
Phenoxymethylpenicillin	-	-		-	-	
Oxacillin	-	-		-	-	
Cloxacillin	-	-		-	-	
Dicloxacillin	-	-		-	-	
Flucloxacillin	-	-		-	-	
Mecillinam (uncomplicated UTI only)	-	-		-	-	

Acinetobacter spp.

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Cephalosporins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Cefaclor	-	-		-	-	
Cefadroxil	-	-		-	-	
Cefalexin	-	-		-	-	
Cefazolin	-	-		-	-	
Cefepime	-	-		-	-	
Cefixime	-	-		-	-	
Cefotaxime	-	-		-	-	
Cefoxitin	-	-		-	-	
Cefpodoxime	-	-		-	-	
Ceftaroline	-	-		-	-	
Ceftazidime	-	-		-	-	
Ceftibuten	-	-		-	-	
Ceftriaxone	-	-		-	-	
Cefuroxime iv	-	-		-	-	
Cefuroxime oral	-	-		-	-	

Carbapenems	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doripenem	1	4	10	21	15	
Ertapenem	-	-		-	-	
Imipenem	2	8	10	23	17	
Meropenem	2	8	10	21	15	

Monobactams	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Aztreonam	-	-		-	-	

Fluoroquinolones	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Ciprofloxacin	1	1	5	21	21	
Levofloxacin	1	2	5	21	18	
Moxifloxacin	-	-		-	-	
Nalidixic acid (screen)	NA	NA		NA	NA	
Norfloxacin	-	-		-	-	
Ofloxacin	-	-		-	-	

Aminoglycosides[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. Aminoglycoside breakpoints are based on once-daily administration of high aminoglycoside dosages. Most often aminoglycosides are given in combination with beta-lactam agents.
Amikacin	8	16	30	18	15	
Gentamicin	4	4	10	17	17	
Netilmicin	4	4	10	16	16	
Tobramycin	4	4	10	17	17	

Glycopeptides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Teicoplanin	-	-		-	-	
Telavancin	-	-		-	-	
Vancomycin	-	-		-	-	

Macrolides, lincosamides and streptogramins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Azithromycin	-	-		-	-	
Clarithromycin	-	-		-	-	
Erythromycin	-	-		-	-	
Roxithromycin	-	-		-	-	
Telithromycin	-	-		-	-	
Clindamycin	-	-		-	-	
Quinupristin-dalfopristin	-	-		-	-	

Tetracyclines	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doxycycline	-	-		-	-	
Minocycline	IE	IE		IE	IE	
Tetracycline	-	-		-	-	
Tigecycline	IE	IE		IE	IE	

Miscellaneous	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Chloramphenicol	-	-		-	-	
Colistin	2	2		Note[A]	Note[A]	**A.** Use an MIC method.
Daptomycin	-	-		-	-	
Fosfomycin iv	-	-		-	-	
Fosfomycin oral	-	-		-	-	
Fusidic acid	-	-		-	-	
Linezolid	-	-		-	-	
Metronidazole	-	-		-	-	
Mupirocin	-	-		-	-	
Nitrofurantoin (uncomplicated UTI only)	-	-		-	-	
Rifampicin	-	-		-	-	
Spectinomycin	-	-		-	-	
Trimethoprim (uncomplicated UTI only)	-	-		-	-	
Trimethoprim-sulfamethoxazole[1]	2	4	**1.25-23.75**	16	13	**1.** Trimethoprim:sulfamethoxazole in the ratio 1:19. Breakpoints are expressed as the trimethoprim concentration.

Staphylococcus spp.

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Mueller-Hinton agar
Inoculum: McFarland 0.5
Incubation: Air, 35±1ºC, 18±2h
Reading: Read zone edges as the point showing no growth viewed from the back of the plate against a dark background illuminated with reflected light.
Quality control: *Staphylococcus aureus* ATCC 29213

Penicillins[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1/A. With the exception of *S. saprophyticus,* most staphylococci are penicillinase producers. The benzylpenicillin breakpoint will mostly, but not unequivocally, separate beta-lactamase producers from non-producers. If the MIC is >0.12 mg/L, report resistant. If the MIC is ≤0.12mg/L, test susceptibility with the benzylpenicillin disk (**see note B**). Isolates positive for beta-lactamase are resistant to benzylpenicillin, phenoxymethylpenicillin, amino-, carboxy- and ureidopenicillins. Isolates negative for beta-lactamase and susceptible to cefoxitin (cefoxitin is used to screen for "methicillin resistance") can be reported susceptible to these drugs. Isolates positive for beta-lactamase and susceptible to cefoxitin are susceptible to penicillin-beta-lactamase inhibitor combinations and penicillinase-resistant penicillins (oxacillin, cloxacillin, dicloxacillin and flucloxacillin). Isolates resistant to cefoxitin are methicillin resistant and resistant to beta-lactam agents, except those with approved anti-MRSA activity and clinical breakpoints.
Benzylpenicillin, *S. aureus*	0.12[1]	0.12[1,2]	**1 unit**	26[A,B]	26[A,B]	**B**. Disk diffusion is more reliable than MIC for detection of penicillinase producers, provided the zone diameter is measured AND the zone edge closely inspected (see pictures below). If the zone diameter is <26 mm, report resistant. If the zone diameter is ≥26 mm AND the zone edge is sharp, report resistant. If not sharp, report susceptible and if uncertain, report resistant. Chromogenic cephalosporin-based beta-lactamase tests do not reliably detect staphylococcal penicillinase.
Ampicillin, *S. saprophyticus*	Note[1]	Note[1]	**2**	15[A,C]	15[A,C]	**C**. Ampicillin susceptible *S. saprophyticus* are methicillin susceptible and there is no need to screen for methicillin resistance with cefoxitin.
Ampicillin-sulbactam	Note[1]	Note[1]		Note[A]	Note[A]	
Amoxicillin	Note[1]	Note[1]		Note[A]	Note[A]	
Amoxicillin-clavulanate	Note[1]	Note[1]		Note[A]	Note[A]	
Piperacillin	Note[1]	Note[1]		Note[A]	Note[A]	
Piperacillin-tazobactam	Note[1]	Note[1]		Note[A]	Note[A]	
Ticarcillin	Note[1]	Note[1]		Note[A]	Note[A]	
Ticarcillin-clavulanate	Note[1]	Note[1]		Note[A]	Note[A]	
Phenoxymethylpenicillin	Note[1]	Note[1]		Note[A]	Note[A]	
Oxacillin[2]	Note[1,2]	Note[1,2]		Note[A]	Note[A]	**2.** *S. aureus* and *S. lugdunensis* with oxacillin MIC values >2 mg/L are mostly methicillin resistant due to the presence of the *mecA* gene. The corresponding oxacillin MIC for coagulase-negative staphylococci is >0.25 mg/L.
Cloxacillin	Note[1]	Note[1]		Note[A]	Note[A]	
Dicloxacillin	Note[1]	Note[1]		Note[A]	Note[A]	
Flucloxacillin	Note[1]	Note[1]		Note[A]	Note[A]	
Mecillinam (uncomplicated UTI only)	-	-		-	-	

Cephalosporins[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. Susceptibility of staphylococci to cephalosporins is inferred from the cefoxitin susceptibility except for ceftazidime, cefixime and ceftibuten, which do not have breakpoints and should not be used for staphylococcal infections. Some methicillin-resistant *S. aureus* are susceptible to ceftaroline, **see Note 5/B.**
Cefaclor[2]	Note[1]	Note[1]		Note[A]	Note[A]	**2.** High-dose therapy is required for treatment of staphylococcal infections. **A.** Susceptibility inferred from cefoxitin.
Cefadroxil	Note[1]	Note[1]		Note[A]	Note[A]	
Cefalexin	Note[1]	Note[1]		Note[A]	Note[A]	
Cefazolin	Note[1]	Note[1]		Note[A]	Note[A]	
Cefepime	Note[1]	Note[1]		Note[A]	Note[A]	
Cefixime	-	-		-	-	
Cefotaxime	Note[1]	Note[1]		Note[A]	Note[A]	
Cefoxitin (screen), *S. aureus, S. lugdunensis* and *S. saprophyticus*	Note[3]	Note[3]	**30**	22[A]	22[A]	**3.** *S. aureus* and *S. lugdunensis* with cefoxitin MIC values >4 mg/L are methicillin resistant, mostly due to the presence of the *mecA* gene. Disk diffusion reliably predicts methicillin resistance.
Cefoxitin (screen), Coagulase-negative staphylococci	Note[4]	Note[4]	**30**	25[A]	25[A]	**4.** For coagulase-negative staphylococci other than *S. lugdunensis* the cefoxitin MIC is a poorer predictor of methicillin resistance than the disk diffusion test.
Cefpodoxime	Note[1]	Note[1]		Note[A]	Note[A]	
Ceftaroline, *S. aureus*	1[5]	1[5]	**5**	20[B]	20[B]	**5/B**. Methicillin-susceptible isolates can be reported susceptible to ceftaroline without further testing. For methicillin-resistant isolates with ceftaroline zone diameters 19-21 mm, determine the MIC to confirm the susceptibility.
Ceftazidime	-	-		-	-	
Ceftibuten	-	-		-	-	
Ceftriaxone	Note[1]	Note[1]		Note[A]	Note[A]	
Cefuroxime iv	Note[1]	Note[1]		Note[A]	Note[A]	
Cefuroxime oral	Note[1]	Note[1]		Note[A]	Note[A]	

Carbapenems[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1/A. Susceptibility of staphylococci to carbapenems is inferred from the cefoxitin susceptibility.
Doripenem	Note[1]	Note[1]		Note[A]	Note[A]	
Ertapenem	Note[1]	Note[1]		Note[A]	Note[A]	
Imipenem	Note[1]	Note[1]		Note[A]	Note[A]	
Meropenem	Note[1]	Note[1]		Note[A]	Note[A]	

Monobactams	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Aztreonam	-	-		-	-	

Fluoroquinolones[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. For breakpoints for other fluoroquinolones (*e.g.* pefloxacin and enoxacin), refer to breakpoints set by national breakpoint committees.
Ciprofloxacin[2]	1	1	**5**	20[A]	20[A]	**2.** Breakpoints relate to high dose therapy. **A.** The norfloxacin disk diffusion test can be used to screen for fluoroquinolone resistance. **See Note B.**
Levofloxacin	1	2	**5**	22[A]	19[A]	
Moxifloxacin	0.5	1	**5**	24[A]	21[A]	
Nalidixic acid (screen)	NA	NA		NA	NA	
Norfloxacin (screen)	NA	NA	**10**	17[B]	Note[B]	**B.** Isolates categorised as susceptible to norfloxacin can be reported susceptible to ciprofloxacin, levofloxacin, moxifloxacin and ofloxacin. Isolates categorised as non-susceptible should be tested for susceptibility to individual agents.
Ofloxacin[2]	1	1	**5**	20[A]	20[A]	

Aminoglycosides[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. Aminoglycoside breakpoints are based on once-daily administration of high aminoglycoside dosages. Most often aminoglycosides are given in combination with beta-lactam agents.
Amikacin[2], *S. aureus*	8	16	**30**	18	16	**2.** Resistance to amikacin is most reliably determined by testing with kanamycin (zone diameter breakpoints under development).
Amikacin[2], Coagulase-negative staphylococci	8	16	**30**	22	19	
Gentamicin, *S. aureus*	1	1	**10**	18	18	
Gentamicin, Coagulase-negative staphylococci	1	1	**10**	22	22	
Netilmicin, *S. aureus*	1	1	**10**	18	18	
Netilmicin, Coagulase-negative staphylococci	1	1	**10**	22	22	
Tobramycin, *S. aureus*	1	1	**10**	18	18	
Tobramycin, Coagulase-negative staphylococci	1	1	**10**	22	22	

Glycopeptides[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. Glycopeptide MICs are method dependent and should be determined by broth microdilution (reference ISO 20776). *S. aureus* with vancomycin MIC values of 2 mg/L are on the border of the wild type MIC distribution and there may be an impaired clinical response. The resistant breakpoint has been reduced to 2 mg/L to avoid reporting "GISA" isolates intermediate as serious infections with "GISA" isolates are not treatable with increased doses of vancomycin or teicoplanin.
Teicoplanin, *S. aureus*	2	2		Note[A]	Note[A]	**A.** Disk diffusion is unreliable and cannot distinguish between wild type isolates and those with non-*vanA*-mediated resistance.
Teicoplanin, Coagulase-negative staphylococci	4	4		Note[A]	Note[A]	
Telavancin, MRSA	1	1		Note[A]	Note[A]	
Vancomycin, *S. aureus*	2	2		Note[A]	Note[A]	
Vancomycin, Coagulase-negative staphylococci	4	4		Note[A]	Note[A]	

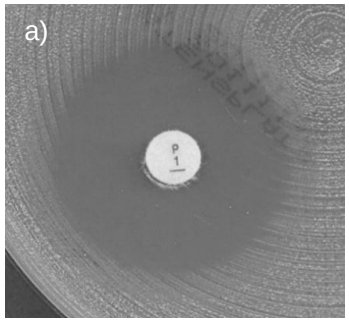
Macrolides, lincosamides and streptogramins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Azithromycin	1[1]	2[1]		Note[A]	Note[A]	**1/A.** Erythromycin can be used to determine susceptibility to azithromycin, clarithromycin and roxithromycin.
Clarithromycin	1[1]	2[1]		Note[A]	Note[A]	
Erythromycin	1[1]	2[1]	**15**	21[A]	18[A]	
Roxithromycin	1[1]	2[1]		Note[A]	Note[A]	
Telithromycin	IE	IE		IE	IE	
Clindamycin[2]	0.25	0.5	**2**	22[B]	19[B]	**2/B.** Inducible clindamycin resistance can be detected only in the presence of a macrolide antibiotic. In disk diffusion tests look for apparent antagonism of clindamycin by erythromycin (D-test).
Quinupristin-dalfopristin	1	2	**15**	21[C]	18[C]	**C.** Isolates non-susceptible by disk diffusion should be confirmed by MIC testing.

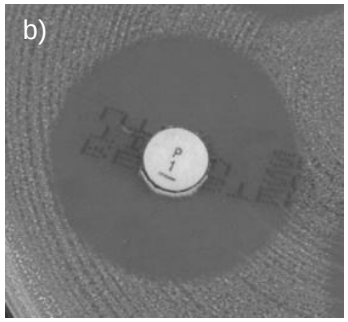
Tetracyclines	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doxycycline	1[1]	2[1]		Note[A]	Note[A]	**1/A**. Isolates susceptible to tetracycline are also susceptible to doxycycline and minocycline, but some resistant to tetracycline may be susceptible to minocycline and/or doxycycline. An MIC method should be used to test doxycycline susceptibility of tetracycline resistant isolates if required.
Minocycline	0.5[1]	1[1]	**30**	23[A]	20[A]	
Tetracycline	1[1]	2[1]	**30**	22[A]	19[A]	
Tigecycline	0.5[2]	0.5	**15**	18	18	**2**. Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant.

Staphylococcus spp.

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Miscellaneous	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Chloramphenicol	8	8	**30**	18	18	
Colistin	-	-		-	-	
Daptomycin	1	1[1]		Note[A]	Note[A]	**1.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant. **A.** Use an MIC method.
Fosfomycin iv	32	32		Note[A]	Note[A]	
Fosfomycin oral	-	-		-	-	
Fusidic acid	1	1	**10**	24	24	
Linezolid	4	4	**10**	19[B]	19[B]	**B.** Examine zone edges with transmitted light (plate held up to light).
Metronidazole	-	-		-	-	
Mupirocin	1[2]	256[2]	**200**	30[C]	18[C]	**2/C.** Breakpoints relate to nasal decolonisation of *S. aureus.* Intermediate isolates are initially cleared as effectively as susceptible isolates but recolonisation is very common.
Nitrofurantoin (uncomplicated UTI only)	64[3]	64[3]	**100**	13[C]	13[C]	**3/C.** Breakpoints apply to *S. saprophyticus* only.
Rifampicin	0.06	0.5	**5**	26	23	
Spectinomycin	-	-		-	-	
Trimethoprim (uncomplicated UTI only)	2	4	**5**	17	14	
Trimethoprim-sulfamethoxazole[4]	2	4	**1.25-23.75**	17	14	**4.** Trimethoprim:sulfamethoxazole in the ratio 1:19. Breakpoints are expressed as the trimethoprim concentration.





Examples of inhibition zones for *Staphylococcus aureus* with benzylpenicillin.
a) Fuzzy zone edge and zone diameter ≥ 26 mm. Report susceptible.
b) Sharp zone edge and zone diameter ≥ 26 mm. Report resistant.

Enterococcus spp.

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

In endocarditis, refer to national or international endocarditis guidelines for breakpoints for *Enterococcus* spp.

Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Mueller-Hinton agar
Inoculum: McFarland 0.5
Incubation: Air, 35±1ºC, 18±2h (for glycopeptides 24 h)
Reading: Read zone edges as the point showing no growth viewed from the back of the plate against a dark background illuminated with reflected light (except for glycopeptides, see below).
Quality control: *Enterococcus faecalis* ATCC 29212

Penicillins[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. *E. faecium* resistant to penicillins can be considered resistant to all other beta-lactam agents including carbapenems.
Benzylpenicillin	-	-		-	-	
Ampicillin	4	8	2	10	8	
Ampicillin-sulbactam[2]	4	8		Note[A]	Note[A]	**2/A.** Susceptibility to ampicillin, amoxicillin and pipercillin with and without beta-lactamase inhibitor can be inferred from ampicillin.
Amoxicillin[2]	4	8		Note[A]	Note[A]	
Amoxicillin-clavulanate[2]	4[3]	8[3]		Note[A]	Note[A]	**3.** For susceptibility testing purposes, the concentration of clavulanate is fixed at 2 mg/L.
Piperacillin[2]	Note[2]	Note[2]		Note[A]	Note[A]	
Piperacillin-tazobactam[2]	Note[2]	Note[2]		Note[A]	Note[A]	
Ticarcillin	-	-		-	-	
Ticarcillin-clavulanate	-	-		-	-	
Phenoxymethylpenicillin	-	-		-	-	
Oxacillin	-	-		-	-	
Cloxacillin	-	-		-	-	
Dicloxacillin	-	-		-	-	
Flucloxacillin	-	-		-	-	
Mecillinam (uncomplicated UTI only)	-	-		-	-	

Cephalosporins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Cefaclor	-	-		-	-	
Cefadroxil	-	-		-	-	
Cefalexin	-	-		-	-	
Cefazolin	-	-		-	-	
Cefepime	-	-		-	-	
Cefixime	-	-		-	-	
Cefotaxime	-	-		-	-	
Cefoxitin	-	-		-	-	
Cefpodoxime	-	-		-	-	
Ceftaroline	-	-		-	-	
Ceftazidime	-	-		-	-	
Ceftibuten	-	-		-	-	
Ceftriaxone	-	-		-	-	
Cefuroxime iv	-	-		-	-	
Cefuroxime oral	-	-		-	-	

Carbapenems	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doripenem	-	-		-	-	
Ertapenem	-	-		-	-	
Imipenem	4	8	10	21	18	
Meropenem	-	-		-	-	

Monobactams	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Aztreonam	-	-		-	-	

Fluoroquinolones	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Ciprofloxacin	-	-		-	-	
Levofloxacin	-	-		-	-	
Moxifloxacin	-	-		-	-	
Nalidixic acid (screen)	NA	NA		NA	NA	
Norfloxacin	-	-		-	-	
Ofloxacin	-	-		-	-	

Aminoglycosides[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. Enterococci are intrinsically resistant to aminoglycosides and aminoglycoside monotherapy is ineffective. There is likely to be synergy between aminoglycosides and penicillins or glycopeptides against enterococci without acquired high-level resistance. All testing is therefore to distinguish between intrinsic and high-level acquired resistance.
Amikacin	Note[2]	Note[2]		Note[A]	Note[A]	
Gentamicin (test for high-level aminoglycoside resistance)	Note[2]	Note[2]	30	Note[A]	Note[A]	**2/A. Negative test:** Isolates with gentamicin MIC ≤128 mg/L or a zone diameter ≥8 mm. The isolate is wild type for gentamicin and low-level intrinsic resistant. For other aminoglycosides, this may not be the case. Synergy with penicillins or glycopeptides can be expected if the isolate is susceptible to the penicillin or glycopeptide. **Positive test:** Isolates with gentamicin MIC >128 mg/L or a zone diameter <8 mm. The isolate is high-level resistant to gentamicin and other aminoglycosides, except streptomycin which must be tested separately if required (see note 3/B). There will be no synergy with penicillins or glycopeptides.
Netilmicin	Note[2]	Note[2]		Note[A]	Note[A]	
Streptomycin (test for high-level streptomycin resistance)	Note[3]	Note[3]	300	Note[B]	Note[B]	**3/B.** Isolates with high-level gentamicin resistance may not be high-level resistant to streptomycin. **Negative test:** Isolates with streptomycin MIC ≤512 mg/L or a zone diameter ≥19 mm. The isolate is wild type for streptomycin and low-level intrinsic resistant. Synergy with penicillins or glycopeptides can be expected if the isolate is susceptible to the penicillin or glycopeptide. **Positive test:** Isolates with streptomycin MIC >512 mg/L or a zone diameter <19 mm. The isolate is high-level resistant to streptomycin. There will be no synergy with penicillins or glycopeptides.
Tobramycin	Note[2]	Note[2]		Note[A]	Note[A]	

Glycopeptides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Teicoplanin	2	2	30	16	16	
Telavancin	IE	IE		IE	IE	
Vancomycin	4	4	5	12[A]	12[A]	**A.** Vancomycin susceptible enterococci exhibit sharp zone edges. Examine zone edges with transmitted light (plate held up to light) and suspect resistance when the vancomycin zone edge is fuzzy or colonies grow within the inhibition zone (see pictures below). Isolates must not be reported susceptible before 24 h incubation.

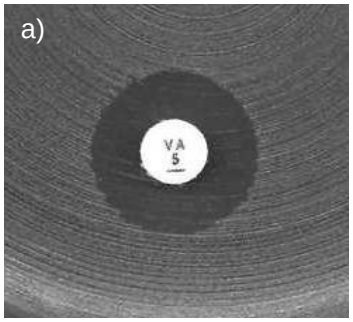
Macrolides, lincosamides and streptogramins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Azithromycin	-	-		-	-	
Clarithromycin	-	-		-	-	
Erythromycin	-	-		-	-	
Roxithromycin	-	-		-	-	
Telithromycin	-	-		-	-	
				-	-	
Clindamycin	-	-		-	-	
Quinupristin-dalfopristin	1[1]	4[1]	15	22[A]	20[A]	**1/A.** Quinupristin-dalfopristin breakpoints apply to *E. faecium* only.

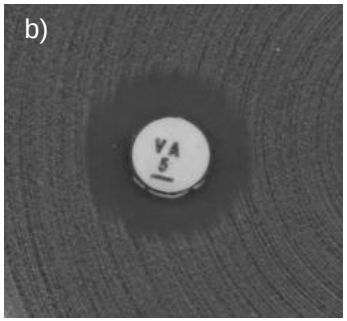
Tetracyclines	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doxycycline	-	-		-	-	
Minocycline	-	-		-	-	
Tetracycline	-	-		-	-	
Tigecycline	0.25[1]	0.5	15	18	15	**1.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant.

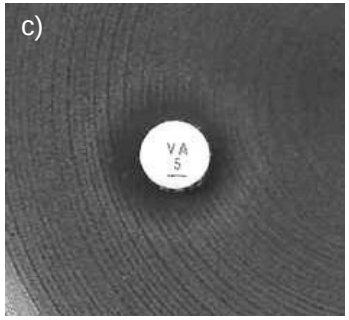
Enterococcus spp.

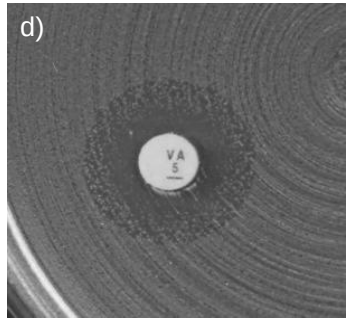
EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Miscellaneous	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Chloramphenicol	-	-		-	-	
Colistin	-	-		-	-	
Daptomycin	IE	IE		IE	IE	
Fosfomycin iv	-	-		-	-	
Fosfomycin oral	-	-		-	-	
Fusidic acid	-	-		-	-	
Linezolid	4	4	10	19	19	
Metronidazole	-	-		-	-	
Mupirocin	-	-		-	-	
Nitrofurantoin (uncomplicated UTI only)	64[1]	64[1]	100	15[A]	15[A]	**1/A.** Nitrofurantoin breakpoints apply to *E. faecalis* only.
Rifampicin	-	-		-	-	
Spectinomycin	-	-		-	-	
Trimethoprim (uncomplicated UTI only)[2]	0.03	1	5	50	21	**2.** The activity of trimethoprim is uncertain against enterococci, hence the wild type population is categorised as intermediate.
Trimethoprim-sulfamethoxazole[3]	0.03	1	1.25-23.75	50	21	**3.** Trimethoprim-sulfamethoxazole in the ratio 1:19. Breakpoints are expressed as the trimethoprim concentration.









Examples of inhibition zones for *Enterococcus spp.* with vancomycin.
a) Sharp zone edge **and** zone diameter ≥ 12 mm. Report susceptible.
b-d) Fuzzy zone edge or colonies within zone. Report resistant even if the zone diameter ≥ 12 mm.

Streptococcus groups A, B, C and G

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Mueller-Hinton agar + 5% defibrinated horse blood and 20 mg/L β-NAD (MH-F)
Inoculum: McFarland 0.5
Incubation: 5% CO_2, 35±1ºC, 18±2h
Reading: Read zone edges as the point showing no growth viewed from the front of the plate with the lid removed and with reflected light.
Quality control: *Streptococcus pneumoniae* ATCC 49619

Penicillins[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1/A. The beta-lactam susceptibility of streptococcus groups A, B, C and G is inferred from the penicillin susceptibility.
Benzylpenicillin[2]	0.25	0.25	**1 unit**	18	18	**2.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant.
Ampicillin	Note[1]	Note[1]		Note[A]	Note[A]	
Ampicillin-sulbactam[3]	Note[1]	Note[1]		Note[A]	Note[A]	**3**. Streptococcus groups A, B, C and G do not produce beta-lactamase. The addition of a beta-lactamase inhibitor does not add clinical benefit.
Amoxicillin	Note[1]	Note[1]		Note[A]	Note[A]	
Amoxicillin-clavulanate[3]	Note[1]	Note[1]		Note[A]	Note[A]	
Piperacillin	Note[1]	Note[1]		Note[A]	Note[A]	
Piperacillin-tazobactam[3]	Note[1]	Note[1]		Note[A]	Note[A]	
Ticarcillin	-	-		-	-	
Ticarcillin-clavulanate	-	-		-	-	
Phenoxymethylpenicillin	Note[1,4]	Note[1,4]		Note[A,B]	Note[A,B]	**4/B**. The phenoxymethylpenicillin breakpoints apply to streptococcus groups A, C and G only.
Oxacillin	NA	NA		NA	NA	
Cloxacillin	Note[1]	Note[1]		Note[A]	Note[A]	
Dicloxacillin	Note[1]	Note[1]		Note[A]	Note[A]	
Flucloxacillin	Note[1]	Note[1]		Note[A]	Note[A]	
Mecillinam (uncomplicated UTI only)	-	-		-	-	

Streptococcus groups A, B, C and G

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Cephalosporins[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1/A. The beta-lactam susceptibility of streptococcus groups A, B, C and G is inferred from the penicillin susceptibility.
Cefaclor	Note[1]	Note[1]		Note[A]	Note[A]	
Cefadroxil	Note[1]	Note[1]		Note[A]	Note[A]	
Cefalexin	Note[1]	Note[1]		Note[A]	Note[A]	
Cefazolin	Note[1]	Note[1]		Note[A]	Note[A]	
Cefepime	Note[1]	Note[1]		Note[A]	Note[A]	
Cefixime	-	-		-	-	
Cefotaxime	Note[1]	Note[1]		Note[A]	Note[A]	
Cefoxitin	NA	NA		NA	NA	
Cefpodoxime	Note[1]	Note[1]		Note[A]	Note[A]	
Ceftaroline	Note[1]	Note[1]		Note[A]	Note[A]	
Ceftazidime	-	-		-	-	
Ceftibuten	Note[1]	Note[1]		Note[A]	Note[A]	
Ceftriaxone	Note[1]	Note[1]		Note[A]	Note[A]	
Cefuroxime iv	Note[1]	Note[1]		Note[A]	Note[A]	
Cefuroxime oral	Note[1]	Note[1]		Note[A]	Note[A]	

Carbapenems[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1/A. The beta-lactam susceptibility of streptococcus groups A, B, C and G is inferred from the penicillin susceptibility.
Doripenem	Note[1]	Note[1]		Note[A]	Note[A]	
Ertapenem	Note[1]	Note[1]		Note[A]	Note[A]	
Imipenem	Note[1]	Note[1]		Note[A]	Note[A]	
Meropenem	Note[1]	Note[1]		Note[A]	Note[A]	

Monobactams	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Aztreonam	-	-		-	-	

Fluoroquinolones	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Ciprofloxacin	-	-		-	-	
Levofloxacin	1	2	5	18[A]	15[A]	**A.** The norfloxacin disk diffusion test can be used to screen for fluoroquinolone resistance. **See Note B.**
Moxifloxacin	0.5	1	5	18[A]	15[A]	
Nalidixic acid (screen)	NA	NA		NA	NA	
Norfloxacin (screen)	NA	NA	10	12[B]	Note[B]	**B.** Isolates categorised as susceptible to norfloxacin can be reported susceptible to levofloxacin and moxifloxacin. Isolates categorised as non-susceptible should be tested for susceptibility to individual agents.
Ofloxacin	-	-		-	-	

Aminoglycosides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Amikacin	-	-		-	-	
Gentamicin	-	-		-	-	
Netilmicin	-	-		-	-	
Tobramycin	-	-		-	-	

Glycopeptides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Teicoplanin	2[1]	2	30	15[A]	15[A]	**1.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant. **A.** Zone diameter breakpoints are based on wild type distributions as there are currently no resistant isolates.
Telavancin	IE	IE		IE	IE	
Vancomycin	2[1]	2	5	13[A]	13[A]	

Macrolides, lincosamides and streptogramins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Azithromycin	0.25[1]	0.5[1]		Note[A]	Note[A]	**1/A.** Erythromycin can be used to determine susceptibility to azithromycin, clarithromycin and roxithromycin.
Clarithromycin	0.25[1]	0.5[1]		Note[A]	Note[A]	
Erythromycin	0.25[1]	0.5[1]	**15**	21[A]	18[A]	
Roxithromycin	0.5[1]	1[1]		Note[A]	Note[A]	
Telithromycin	0.25	0.5	**15**	20	17	
Clindamycin[2]	0.5	0.5	**2**	17[B]	17[B]	**2/B**. Inducible clindamycin resistance can be detected only in the presence of a macrolide antibiotic. In disk diffusion tests look for apparent antagonism of clindamycin by erythromycin (D-test).
Quinupristin-dalfopristin	-	-		-	-	

Tetracyclines	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doxycycline	1[1]	2[1]		Note[A]	Note[A]	**1/A**. Isolates susceptible to tetracycline are also susceptible to doxycycline and minocycline, but some resistant to tetracycline may be susceptible to minocycline and/or doxycycline. An MIC method should be used to test doxycycline susceptibility of tetracycline resistant isolates if required.
Minocycline	0.5[1]	1[1]	**30**	23[A]	20[A]	
Tetracycline	1[1]	2[1]	**30**	23[A]	20[A]	
Tigecycline	0.25[2]	0.5	**15**	19	16	**2.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant.

Miscellaneous agents	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Chloramphenicol	8	8	**30**	19	19	
Colistin	-	-		-	-	
Daptomycin	1[1]	1		Note[A]	Note[A]	**1.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant. **A.** Use an MIC method.
Fosfomycin iv	-	-		-	-	
Fosfomycin oral	-	-		-	-	
Fusidic acid	IE	IE		IE	IE	
Linezolid	2	4	**10**	19	16	
Metronidazole	-	-		-	-	
Mupirocin	-	-		-	-	
Nitrofurantoin (uncomplicated UTI only)	64[2]	64[2]	**100**	15[B]	15[B]	**2/B.** Nitrofurantoin breakpoints apply to *S. agalactiae* (group B streptococci) only.
Rifampicin	0.06	0.5	**5**	21	15	
Spectinomycin	-	-		-	-	
Trimethoprim (uncomplicated UTI only)	2[3]	2[3]	**5**	IP	IP	**3.** Trimethoprim breakpoints apply to *S. agalactiae* (group B streptococci) only.
Trimethoprim-sulfamethoxazole[4]	1	2	**1.25-23.75**	18	15	**4.** Trimethoprim-sulfamethoxazole in the ratio 1:19. Breakpoints are expressed as the trimethoprim concentration.

Streptococcus pneumoniae

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Mueller-Hinton agar + 5% defibrinated horse blood and 20 mg/L β-NAD (MH-F)
Inoculum: McFarland 0.5 from blood agar or McFarland 1.0 from chocolate agar
Incubation: 5% CO_2, 35±1ºC, 18±2h
Reading: Read zone edges as the point showing no growth viewed from the front of the plate with the lid removed and with reflected light.
Quality control: *Streptococcus pneumoniae* ATCC 49619

Penicillins[1]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. Breakpoints for penicillins other than benzylpenicillin relate only to non-meningitis isolates. Isolates fully susceptible to benzylpenicillin (MIC ≤0.06 mg/L and/or susceptible by **oxacillin disk screen, see note C**) can be reported susceptible to beta-lactam agents for which clinical breakpoints are listed (including those with "Note").
Benzylpenicillin (infections other than meningitis)	0.06[1,2]	2[1,2]		Note[A]	Note[A]	**2. In pneumonia**, when a dose of 1.2 g x 4 is used, isolates with **MIC ≤0.5 mg/L** should be regarded as susceptible. **In pneumonia**, when a dose of 2.4 g x 4 or 1.2 g x 6 is used, isolates with **MIC ≤1 mg/L** should be regarded as susceptible. **In pneumonia**, when a dose of 2.4 g x 6 is used, isolates with **MIC ≤2 mg/L** should be regarded as susceptible. **A**. Screen for beta-lactam resistance with the oxacillin 1 µg disk, **see Note C**.
Benzylpenicillin (meningitis)	0.06[1]	0.06[1]		Note[A]	Note[A]	
Ampicillin	0.5[1]	2[1]		Note[A,B]	Note[A,B]	**B.** Susceptibility inferred from the MIC of ampicillin.
Ampicillin-sulbactam	Note[1,3]	Note[1,3]		Note[A,B]	Note[A,B]	**3.** Susceptibility inferred from the MIC of ampicillin.
Amoxicillin	Note[1,3]	Note[1,3]		Note[A,B]	Note[A,B]	
Amoxicillin-clavulanate	Note[1,3]	Note[1,3]		Note[A,B]	Note[A,B]	
Piperacillin	Note[1,3]	Note[1,3]		Note[A,B]	Note[A,B]	
Piperacillin-tazobactam	Note[1,3]	Note[1,3]		Note[A,B]	Note[A,B]	
Ticarcillin	-	-		-	-	
Ticarcillin-clavulanate	-	-		-	-	
Phenoxymethylpenicillin	Note[1]	Note[1]		Note[A]	Note[A]	
Oxacillin (screen)	NA	NA	**1**	20[C]	Note[C]	**C. For interpretation of the oxacillin disk screen, see supplementary table below.** For oxacillin non-susceptible isolates, always determine the MIC of benzylpenicillin.
Cloxacillin	-	-		-	-	
Dicloxacillin	-	-		-	-	
Flucloxacillin	-	-		-	-	
Mecillinam (uncomplicated UTI only)	-	-		-	-	

Cephalosporins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Cefaclor	0.03	0.5	**30**	50	28	
Cefadroxil	-	-		-	-	
Cefalexin	-	-		-	-	
Cefazolin	-	-		-	-	
Cefepime	1[1]	2		Note[A]	Note[A]	**1.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant. **A.** Screen for beta-lactam resistance with the oxacillin 1 µg disk. **See supplementary table below.**
Cefixime	-	-		-	-	
Cefotaxime	0.5[1]	2		Note[A]	Note[A]	
Cefoxitin	NA	NA		NA	NA	
Cefpodoxime	0.25	0.5		Note[A]	Note[A]	
Ceftaroline	0.25	0.25		Note[A]	Note[A]	
Ceftazidime	-	-		-	-	
Ceftibuten	-	-		-	-	
Ceftriaxone	0.5[1]	2		Note[A]	Note[A]	
Cefuroxime iv	0.5	1		Note[A]	Note[A]	
Cefuroxime oral	0.25	0.5		Note[A]	Note[A]	

Carbapenems	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doripenem[1]	1[2]	1		Note[A]	Note[A]	**1.** Not for meningitis (meropenem is the only carbapenem used for meningitis). **2.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant. **A.** Screen for beta-lactam resistance with the oxacillin 1 µg disk. **See supplementary table below.**
Ertapenem[1]	0.5[2]	0.5		Note[A]	Note[A]	
Imipenem[1]	2[2]	2		Note[A]	Note[A]	
Meropenem[3] **(infections other than meningitis)**	2	2		Note[A]	Note[A]	**3.** Meropenem is the only carbapenem used for meningitis.
Meropenem[3] **(meningitis)**	0.25	1		Note[A,B]	Note[A,B]	**B.** For use in meningitis determine the meropenem MIC.

Monobactams	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Aztreonam	-	-		-	-	

Fluoroquinolones	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Ciprofloxacin[1]	0.12	2	**5**	50[A]	16[A]	**1.** Wild type *S. pneumoniae* are not considered susceptible to ciprofloxacin and are therefore categorised as intermediate. **A.** The norfloxacin disk diffusion test can be used to screen for fluoroquinolone resistance. **See Note B.**
Levofloxacin[2]	2	2	**5**	17[A]	17[A]	**2.** The breakpoints for levofloxacin relate to high dose therapy.
Moxifloxacin	0.5	0.5	**5**	22[A]	22[A]	
Nalidixic acid (screen)	NA	NA		NA	NA	
Norfloxacin (screen)	NA	NA	**10**	12[B]	Note[B]	**B.** Isolates categorised as susceptible to norfloxacin can be reported susceptible to levofloxacin and moxifloxacin and intermediate to ciprofloxacin and ofloxacin. Isolates categorised as non-susceptible should be tested for susceptibility to individual agents.
Ofloxacin[3]	0.12	4	**5**	50[A]	13[A]	**3.** Wild type *S. pneumoniae* are not considered susceptible to ofloxacin and are therefore categorised as intermediate.

Aminoglycosides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Amikacin	-	-		-	-	
Gentamicin	-	-		-	-	
Netilmicin	-	-		-	-	
Tobramycin	-	-		-	-	

Glycopeptides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Teicoplanin	2[1]	2	**30**	17[A]	17[A]	**1.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant. **A.** Zone diameter breakpoints are based on wild type distributions as there are currently no resistant isolates.
Telavancin	IE	IE		IE	IE	
Vancomycin	2[1]	2	**5**	16[A]	16[A]	

Macrolides, lincosamides and streptogramins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Azithromycin	0.25[1]	0.5[1]		Note[A]	Note[A]	**1/A.** Erythromycin can be used to determine susceptibility to azithromycin, clarithromycin and roxithromycin.
Clarithromycin	0.25[1]	0.5[1]		Note[A]	Note[A]	
Erythromycin	0.25[1]	0.5[1]	**15**	22[A]	19[A]	
Roxithromycin	0.5[1]	1[1]		Note[A]	Note[A]	
Telithromycin	0.25	0.5	**15**	23	20	
Clindamycin[2]	0.5	0.5	**2**	19[B]	19[B]	**2/B.** Inducible clindamycin resistance can be detected only in the presence of a macrolide antibiotic. In disk diffusion tests look for apparent antagonism of clindamycin by erythromycin (D-test).
Quinupristin-dalfopristin	-	-		-	-	

Tetracyclines	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doxycycline	1[1]	2[1]		Note[A]	Note[A]	**1/A**. Isolates susceptible to tetracycline are also susceptible to doxycycline and minocycline, but some resistant to tetracycline may be susceptible to minocycline and/or doxycycline. An MIC method should be used to test doxycycline susceptibility of tetracycline resistant isolates if required.
Minocycline	0.5[1]	1[1]	**30**	24[A]	21[A]	
Tetracycline	1[1]	2[1]	**30**	25[A]	22[A]	
Tigecycline	IE	IE		IE	IE	

Miscellaneous agents	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Chloramphenicol	8	8	30	21	21	
Colistin	-	-		-	-	
Daptomycin	IE	IE		IE	IE	
Fosfomycin iv	IE	IE		IE	IE	
Fosfomycin oral	-	-		-	-	
Fusidic acid	-	-		-	-	
Linezolid	2	4	10	22	19	
Metronidazole	-	-		-	-	
Mupirocin	-	-		-	-	
Nitrofurantoin (uncomplicated UTI only)	-	-		-	-	
Rifampicin	0.06	0.5	5	22	17	
Spectinomycin	-	-		-	-	
Trimethoprim (uncomplicated UTI only)	-	-		-	-	
Trimethoprim-sulfamethoxazole[1]	1	2	1.25-23.75	18	15	**1.** Trimethoprim:sulfamethoxazole in the ratio 1:19. Breakpoints are expressed as the trimethoprim concentration.

Screening for beta-lactam resistance in *S. pneumoniae*

Supplementary table

Oxacillin 1 µg disk Zone diameter	Antimicrobial agent	Further testing and/or interpretation
≥ 20 mm	All beta-lactam agents for which clinical breakpoints are listed (inlcuding those with "Note")	Report susceptible irrespective of clinical indication.
< 20 mm*	Benzylpenicillin (meningitis) and phenoxymethylpenicillin (all indications)	Report resistant.
	Benzylpenicillin (for infections other than meningitis)	Determine the MIC and interpret according to the clinical breakpoints.
	Ampicillin and amoxicillin (without and with beta-lactamase inhibitor), cefepime, cefotaxime and ceftriaxone	**Oxacillin zone diameter ≥ 8 mm**: Report susceptible.
		Oxacillin zone diameter < 8 mm: determine the MIC of the beta-lactam agent intended for clinical use but for ampicillin, amoxicillin and piperacillin (without and with beta-lactamase inhibitor) infer susceptibility from the MIC of ampicillin.
	Other beta-lactam agents	Determine the MIC of the agent considered for clinical use and interpret according to the clinical breakpoints.

***Oxacillin 1 µg < 20 mm: Always determine the MIC of benzylpenicillin but do not delay reporting as recommended above.**

Viridans group streptococci

In endocarditis, refer to national or international endocarditis guidelines for breakpoints for viridans group streptococci.

Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Mueller-Hinton agar + 5% defibrinated horse blood and 20 mg/L β-NAD (MH-F)
Inoculum: McFarland 0.5
Incubation: 5% CO_2, 35±1ºC, 18±2h
Reading: Read zone edges as the point showing no growth viewed from the front of the platewith the lid removed and with reflected light.
Quality control: *Streptococcus pneumoniae* ATCC 49619

Penicillins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Benzylpenicillin	0.25	2	1 unit	18	12	
Benzylpenicillin (screen)	NA	NA	1 unit	18[A]	Note[A]	**A**. Benzylpenicillin 1 unit can be used to screen for beta-lactam resistance in viridans group streptococci. Isolates categorised as susceptible can be reported susceptible to beta-lactam agents for which clinical breakpoints are listed (including those with "Note"). Isolates categorised as non-susceptible should be tested for susceptibility to individual agents.
Ampicillin	0.5	2	2	21	15	
Ampicillin-sulbactam	Note[1]	Note[1]		Note[A,B]	Note[A,B]	**1/B.** For isolates susceptible to benzylpenicillin, susceptibility can be inferred from benzylpenicillin or ampicillin. For isolates resistant to benzylpenicillin, susceptibility is inferred from ampicillin.
Amoxicillin	0.5	2		Note[A,B]	Note[A,B]	
Amoxicillin-clavulanate	Note[1]	Note[1]		Note[A,B]	Note[A,B]	
Piperacillin	Note[1]	Note[1]		Note[A,B]	Note[A,B]	
Piperacillin-tazobactam	Note[1]	Note[1]		Note[A,B]	Note[A,B]	
Ticarcillin	IE	IE		IE	IE	
Ticarcillin-clavulanate	IE	IE		IE	IE	
Phenoxymethylpenicillin	IE	IE		IE	IE	
Oxacillin	-	-		-	-	
Cloxacillin	-	-		-	-	
Dicloxacillin	-	-		-	-	
Flucloxacillin	-	-		-	-	
Mecillinam (uncomplicated UTI only)	-	-		-	-	

Cephalosporins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Cefaclor	-	-		-	-	
Cefadroxil	-	-		-	-	
Cefalexin	-	-		-	-	
Cefazolin	0.5	0.5	30	IP	IP	
Cefepime	0.5	0.5	30	25[A]	25[A]	**A**. Benzylpenicillin 1 unit can be used to screen for beta-lactam resistance in viridans group streptococci. **See Note A on penicillins.**
Cefixime	-	-		-	-	
Cefotaxime	0.5	0.5	5	23[A]	23[A]	
Cefoxitin	NA	NA		NA	NA	
Cefpodoxime	-	-		-	-	
Ceftaroline	-	-		-	-	
Ceftazidime	-	-		-	-	
Ceftibuten	-	-		-	-	
Ceftriaxone	0.5	0.5	30	27[A]	27[A]	
Cefuroxime iv	0.5	0.5	30	26[A]	26[A]	
Cefuroxime oral	-	-		-	-	

Carbapenems	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doripenem	1[1]	1		Note[A]	Note[A]	**1.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant. **A**. Benzylpenicillin 1 unit can be used to screen for beta-lactam resistance in viridans group streptococci. **See Note A on penicillins.**
Ertapenem	0.5[1]	0.5		Note[A]	Note[A]	
Imipenem	2[1]	2		Note[A]	Note[A]	
Meropenem	2[1]	2		Note[A]	Note[A]	

Monobactams	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Aztreonam	-	-		-	-	

Fluoroquinolones	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Ciprofloxacin	-	-		-	-	
Levofloxacin	-	-		-	-	
Moxifloxacin	-	-		-	-	
Nalidixic acid (screen)	NA	NA		NA	NA	
Norfloxacin	-	-		-	-	
Ofloxacin	-	-		-	-	

Aminoglycosides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Amikacin	-	-		-	-	
Gentamicin	-	-		-	-	
Netilmicin	-	-		-	-	
Tobramycin	-	-		-	-	

Glycopeptides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Teicoplanin	2[1]	2	30	16[A]	16[A]	**1.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant. **A.** Zone diameter breakpoints are based on wild type distributions as there are currently no resistant isolates.
Telavancin	IE	IE		IE	IE	
Vancomycin	2[1]	2	5	15[A]	15[A]	

Macrolides, lincosamides and streptogramins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Azithromycin	IE	IE		IE	IE	
Clarithromycin	IE	IE		IE	IE	
Erythromycin	IE	IE		IE	IE	
Roxithromycin	IE	IE		IE	IE	
Telithromycin	IE	IE		IE	IE	
Clindamycin[1]	0.5	0.5	2	19[A]	19[A]	**1/A.** Inducible clindamycin resistance can be detected only in the presence of a macrolide antibiotic. In disk diffusion tests look for apparent antagonism of clindamycin by erythromycin (D-test).
Quinupristin-dalfopristin	IE	IE		IE	IE	

Tetracyclines	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doxycycline	-	-		-	-	
Minocycline	-	-		-	-	
Tetracycline	-	-		-	-	
Tigecycline	IE	IE		IE	IE	

Miscellaneous agents	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Chloramphenicol	-	-		-	-	
Colistin	-	-		-	-	
Daptomycin	-	-		-	-	
Fosfomycin iv	-	-		-	-	
Fosfomycin oral	-	-		-	-	
Fusidic acid	-	-		-	-	
Linezolid	-	-		-	-	
Metronidazole	-	-		-	-	
Mupirocin	-	-		-	-	
Nitrofurantoin (uncomplicated UTI only)	-	-		-	-	
Rifampicin	-	-		-	-	
Spectinomycin	-	-		-	-	
Trimethoprim (uncomplicated UTI only)	-	-		-	-	
Trimethoprim-sulfamethoxazole	-	-		-	-	

Haemophilus influenzae

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

EUCAST breakpoints have been defined for *H. influenzae* only. Clinical data for other *Haemophilus* species are scarce. MIC distributions for *H. parainfluenzae* are similar to those for *H. influenzae*. In the absence of specific breakpoints the *H. influenzae* breakpoints can be applied to *H. parainfluenzae*.

Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Mueller-Hinton agar + 5% defibrinated horse blood and 20 mg/L β-NAD (MH-F)
Inoculum: McFarland 0.5
Incubation: 5% CO_2, 35±1ºC, 18±2h
Reading: Read zone edges as the point showing no growth viewed from the front of the plate with the lid removed and with reflected light.
Quality control: *Haemophilus influenzae* NCTC 8468

Penicillins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Benzylpenicillin	IE	IE		IE	IE	
Benzylpenicillin (screen)	NA	NA	1 unit	12[A]	Note[A]	**A.** Benzylpenicillin 1 unit can be used to screen for, but not to distinguish between, beta-lactamase producing isolates and isolates with PBP mutations. **For interpretation of the benzylpenicillin disk screen, see supplementary table below.**
Ampicillin	1[1]	1[1]	2	16[A]	16[A]	**1.** Breakpoints are based on intravenous administration. For penicillins without inhibitors, breakpoints apply to beta-lactamase negative isolates only. For penicillins without inhibitors, beta-lactamase positive isolates should be reported resistant.
Ampicillin-sulbactam	1[1,2,3]	1[1,2,3]	10-10	Note[A,B]	Note[A,B]	**2.** For susceptibility testing purposes, the concentration of sulbactam is fixed at 4 mg/L. **3/B.** Susceptibility can be inferred from amoxicillin-clavulanate.
Amoxicillin	2[1]	2[1]		Note[A,C]	Note[A,C]	**C.** Susceptibility inferred from ampicillin.
Amoxicillin-clavulanate	2[1,4]	2[1,4]	2-1	15[A]	15[A]	**4.** For susceptibility testing purposes, the concentration of clavulanate is fixed at 2 mg/L.
Piperacillin	Note[1,5]	Note[1,5]		Note[A,D]	Note[A,D]	**5/D.** Susceptibility inferred from ampicillin or amoxicillin.
Piperacillin-tazobactam	Note[1,3]	Note[1,3]		Note[A]	Note[A]	
Ticarcillin	IE	IE		IE	IE	
Ticarcillin-clavulanate	IE	IE		IE	IE	
Phenoxymethylpenicillin	IE	IE		IE	IE	
Oxacillin	-	-		-	-	
Cloxacillin	-	-		-	-	
Dicloxacillin	-	-		-	-	
Flucloxacillin	-	-		-	-	
Mecillinam (uncomplicated UTI only)	-	-		-	-	

Cephalosporins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Cefaclor	0.5[1]	0.5		Note[A]	Note[A]	**1/A.** MIC breakpoints render all *H. influenzae* resistant to cefaclor.
Cefadroxil	-	-		-	-	
Cefalexin	-	-		-	-	
Cefazolin	-	-		-	-	
Cefepime	0.25[2]	0.25	**30**	27[B]	27[B]	**2.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant. **B.** Benzylpenicillin 1 unit can be used to screen for beta-lactam resistance. **See supplementary table below.**
Cefixime	0.12[2]	0.12	**5**	25[B]	25[B]	
Cefotaxime	0.12[2]	0.12	**5**	26[B]	26[B]	
Cefoxitin	NA	NA		NA	NA	
Cefpodoxime	0.25[2]	0.5	**10**	26[B]	23[B]	
Ceftaroline	0.03	0.03		IP	IP	
Ceftazidime	-	-		-	-	
Ceftibuten	1[2]	1	**30**	25[B]	25[B]	
Ceftriaxone	0.12[2]	0.12	**30**	30[B]	30[B]	
Cefuroxime iv	1	2	**30**	26[B]	25[B]	
Cefuroxime oral	0.12	1	**30**	50	26	

Carbapenems	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doripenem[1]	1[2]	1	**10**	20[A]	20[A]	**1.** Not for meningitis (meropenem is the only carbapenem used for meningitis). **2.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant. **A.** Benzylpenicillin 1 unit can be used to screen for beta-lactam resistance. **See supplementary table below.**
Ertapenem[1]	0.5[2]	0.5	**10**	20[A]	20[A]	
Imipenem[1]	2[2]	2	**10**	20[A]	20[A]	
Meropenem[3] **(infections other than meningitis)**	2[2]	2	**10**	20[A]	20[A]	**3.** Meropenem is the only carbapenem used for meningitis.
Meropenem[3] **(meningitis)**	0.25	1		Note[B]	Note[B]	**B.** For use in meningitis determine the meropenem MIC value.

Monobactams	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Aztreonam	IE	IE		IE	IE	

Fluoroquinolones[1,2]	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. Low-level fluoroquinolone resistance (ciprofloxacin MICs of 0.12-0.5 mg/L) may occur but there is no evidence that this resistance is of clinical importance in respiratory tract infections with *H. influenzae* .
Ciprofloxacin	0.5[2]	0.5	**5**	26[A]	26[A]	**2.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant. **A.** The nalidixic acid disk diffusion test can be used to screen for fluoroquinolone resistance. **See Note B.**
Levofloxacin	1[2]	1	**5**	26[A]	26[A]	
Moxifloxacin	0.5[2]	0.5	**5**	25[A]	25[A]	
Nalidixic acid (screen)	NA	NA	**30**	23[B]	Note[B]	**B.** Isolates categorised as susceptible to nalidixic acid can be reported susceptible to levofloxacin, ciprofloxacin, moxifloxacin and ofloxacin. Isolates categorised as non-susceptible may have fluoroquinolone resistance and should be tested against the appropriate agent.
Norfloxacin	-	-		-	-	
Ofloxacin	0.5[2]	0.5	**5**	23[A]	23[A]	

Aminoglycosides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Amikacin	IE	IE		IE	IE	
Gentamicin	IE	IE		IE	IE	
Netilmicin	IE	IE		IE	IE	
Tobramycin	IE	IE		IE	IE	

Glycopeptides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Teicoplanin	-	-		-	-	
Telavancin	-	-		-	-	
Vancomycin	-	-		-	-	

Macrolides[1], lincosamides and streptogramins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
						1. Correlation between macrolide MICs and clinical outcome is weak for *H. influenzae* . Therefore, breakpoints for macrolides and related antibiotics have been set to categorise wild type *H. influenzae* as intermediate.
Azithromycin	0.12[2]	4[2]		Note[A]	Note[A]	**2/A**. Erythromycin can be used to determine susceptibility to azithromycin, clarithromycin and roxithromycin.
Clarithromycin	1[2]	32[2]		Note[A]	Note[A]	
Erythromycin	0.5	16	**15**	50	10	
Roxithromycin	1[2]	16[2]		Note[A]	Note[A]	
Telithromycin	0.12	8	**15**	50	12	
Clindamycin	-	-		-	-	
Quinupristin-dalfopristin	-	-		-	-	

Tetracyclines	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doxycycline	1[1]	2[1]		Note[A]	Note[A]	**1/A**. Isolates susceptible to tetracycline are also susceptible to doxycycline and minocycline, but some resistant to tetracycline may be susceptible to minocycline and/or doxycycline. An MIC method should be used to test doxycycline susceptibility of tetracycline resistant isolates if required.
Minocycline	1[1]	2[1]	**30**	24[A]	21[A]	
Tetracycline	1[1]	2[1]	**30**	25[A]	22[A]	
Tigecycline	IE	IE		IE	IE	

Miscellaneous agents	MIC breakpoint (mg/L)			Zone diameter breakpoint (mm)		
	S ≤	R >		S ≥	R <	
Chloramphenicol	2	2	30	28	28	
Colistin	-	-		-	-	
Daptomycin	-	-		-	-	
Fosfomycin iv	IE	IE		IE	IE	
Fosfomycin oral	-	-		-	-	
Fusidic acid	-	-		-	-	
Linezolid	-	-		-	-	
Metronidazole	-	-		-	-	
Mupirocin	-	-		-	-	
Nitrofurantoin (uncomplicated UTI only)	-	-		-	-	
Rifampicin (for prophylaxis only)	1	1	5	18	18	
Spectinomycin	-	-		-	-	
Trimethoprim (uncomplicated UTI only)	-	-		-	-	
Trimethoprim-sulfamethoxazole[1]	0.5	1	1.25-23.75	23	20	**1.** Trimethoprim:sulfamethoxazole in the ratio 1:19. Breakpoints are expressed as the trimethoprim concentration.

Screening for beta-lactam resistance in *H. influenzae*

Supplementary table

Benzylpenicillin 1 unit disk Zone diameter	Beta-lactamase	Further testing and/or interpretation
≥ 12 mm	Do not test	Report susceptible to all beta-lactam agents for which clinical breakpoints are listed (including those with “Note”).
< 12 mm	Beta-lactamase negative	Test susceptibility to the beta-lactam agent intended for clinical use.
	Beta-lactamase positive	For ampicillin, amoxicillin and piperacillin, report resistant.
		For other beta-lactam agents, test susceptibility to the beta-lactam agent intended for clinical use.

Moraxella catarrhalis

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Mueller-Hinton agar + 5% defibrinated horse blood and 20 mg/L β-NAD (MH-F)
Inoculum: McFarland 0.5
Incubation: 5% CO_2, 35±1ºC, 18±2h
Reading: Read zone edges as the point showing no growth viewed from the front of the plate with the lid removed and with reflected light.
Quality control: *Haemophilus influenzae* NCTC 8468

Penicillins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Benzylpenicillin	-	-		-	-	
Ampicillin	-[1]	-[1]		-	-	**1.** Most *M. catarrhalis* produce beta-lactamase, although beta-lactamase production is slow and may give weak results with *in vitro* tests. Beta-lactamase producers should be reported resistant to penicillins and aminopenicillins without inhibitors.
Ampicillin-sulbactam	1[2,3]	1[2,3]		Note[A]	Note[A]	**2.** For susceptibility testing purposes, the concentration of sulbactam is fixed at 4 mg/L. **3/A**. Susceptibility can be inferred from amoxicillin-clavulanate.
Amoxicillin	-[1]	-[1]		-	-	
Amoxicillin-clavulanate	1[4]	1[4]	2-1	19	19	**4.** For susceptibility testing purposes, the concentration of clavulanate is fixed at 2 mg/L.
Piperacillin	-[1]	-[1]		-	-	
Piperacillin-tazobactam	Note[3]	Note[3]		Note[A]	Note[A]	
Ticarcillin	IE	IE		IE	IE	
Ticarcillin-clavulanate	IE	IE		IE	IE	
Phenoxymethylpenicillin	-	-		-	-	
Oxacillin	-	-		-	-	
Cloxacillin	-	-		-	-	
Dicloxacillin	-	-		-	-	
Flucloxacillin	-	-		-	-	
Mecillinam (uncomplicated UTI only)	-	-		-	-	

Cephalosporins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Cefaclor	0.12[1]	0.12[1]		Note[A]	Note[A]	**1/A.** MIC breakpoints render all *M. catarrhalis* resistant to cefaclor.
Cefadroxil	-	-		-	-	
Cefalexin	-	-		-	-	
Cefazolin	-	-		-	-	
Cefepime	4	4	**30**	20	20	
Cefixime	0.5	1	**5**	21	18	
Cefotaxime	1	2	**5**	20	17	
Cefoxitin	NA	NA		NA	NA	
Cefpodoxime	IP	IP	**10**	IP	IP	
Ceftaroline	-	-		-	-	
Ceftazidime	-	-		-	-	
Ceftibuten	IE	IE		IE	IE	
Ceftriaxone	1	2	**30**	24	21	
Cefuroxime iv	4	8	**30**	21	18	
Cefuroxime oral	0.12	4	**30**	50	21	

Carbapenems	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doripenem	1[1]	1	**10**	30	30	**1.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant.
Ertapenem	0.5[1]	0.5	**10**	29	29	
Imipenem	2[1]	2	**10**	29	29	
Meropenem	2[1]	2	**10**	33	33	

Monobactams	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Aztreonam	IE	IE		IE	IE	

Fluoroquinolones	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Ciprofloxacin	0.5	0.5	5	23[A]	23[A]	**A.** The nalidixic acid disk diffusion test can be used to screen for fluoroquinolone resistance. **See Note B.**
Levofloxacin	1	1	5	23[A]	23[A]	
Moxifloxacin	0.5	0.5	5	23[A]	23[A]	
Nalidixic acid (screen)	NA	NA	30	23[B]	Note[B]	**B.** Isolates categorised as susceptible to nalidixic acid can be reported susceptible to levofloxacin, ciprofloxacin, moxifloxacin and ofloxacin. Isolates categorised as non-susceptible may have fluoroquinolone resistance and should be tested against the appropriate agent.
Norfloxacin	-	-		-	-	
Ofloxacin	0.5	0.5	5	25[A]	25[A]	

Aminoglycosides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Amikacin	IE	IE		IE	IE	
Gentamicin	IE	IE		IE	IE	
Netilmicin	IE	IE		IE	IE	
Tobramycin	IE	IE		IE	IE	

Glycopeptides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Teicoplanin	-	-		-	-	
Telavancin	-	-		-	-	
Vancomycin	-	-		-	-	

Macrolides, lincosamides and streptogramins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Azithromycin	0.25[1]	0.5[1]		Note[A]	Note[A]	**1/A**. Erythromycin can be used to determine susceptibility to azithromycin, clarithromycin and roxithromycin.
Clarithromycin	0.25[1]	0.5[1]		Note[A]	Note[A]	
Erythromycin	0.25	0.5	**15**	23[A]	20[A]	
Roxithromycin	0.5[1]	1[1]		Note[A]	Note[A]	
Telithromycin	0.25	0.5	**15**	23	20	
Clindamycin	-	-		-	-	
Quinupristin-dalfopristin	-	-		-	-	

Tetracyclines	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doxycycline	1[1]	2[1]		Note[A]	Note[A]	**1/A**. Isolates susceptible to tetracycline are also susceptible to doxycycline and minocycline, but some resistant to tetracycline may be susceptible to minocycline and/or doxycycline. An MIC method should be used to test doxycycline susceptibility of tetracycline resistant isolates if required.
Minocycline	1[1]	2[1]	**30**	25[A]	22[A]	
Tetracycline	1	2	**30**	28[A]	25[A]	
Tigecycline	IE	IE		IE	IE	

Miscellaneous agents	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Chloramphenicol	2[1]	2[1]	**30**	30[A]	30[A]	**1/A**. Breakpoints relate to the topical use of chloramphenicol.
Colistin	-	-		-	-	
Daptomycin	-	-		-	-	
Fosfomycin iv	IE	IE		IE	IE	
Fosfomycin oral	-	-		-	-	
Fusidic acid	-	-		-	-	
Linezolid	-	-		-	-	
Metronidazole	-	-		-	-	
Mupirocin	-	-		-	-	
Nitrofurantoin (uncomplicated UTI only)	-	-		-	-	
Rifampicin	-	-		-	-	
Spectinomycin	-	-		-	-	
Trimethoprim (uncomplicated UTI only)	-	-		-	-	
Trimethoprim-sulfamethoxazole[1]	0.5	1	**1.25-23.75**	18	15	**1.** Trimethoprim:sulfamethoxazole in the ratio 1:19. Breakpoints are expressed as the trimethoprim concentration.

Neisseria gonorrhoeae

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion criteria for antimicrobial susceptibility testing of *Neisseria gonorrhoeae* have not yet been defined and an MIC method should be used. If a commercial MIC method is used, follow the manufacturer´s instructions.

Penicillins[1]	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
			1. Always test for beta-lactamase. If positive, report resistant to benzylpenicillin, ampicillin and amoxicillin. The susceptibility of beta-lactamase negative isolates to ampicillin and amoxicillin can be inferred from benzylpenicillin.
Benzylpenicillin	0.06	1	
Ampicillin[1]	Note[1]	Note[1]	
Ampicillin-sulbactam	IE	IE	
Amoxicillin[1]	Note[1]	Note[1]	
Amoxicillin-clavulanate	Note[1]	Note[1]	
Piperacillin	-	-	
Piperacillin-tazobactam	-	-	
Ticarcillin	-	-	
Ticarcillin-clavulanate	-	-	
Phenoxymethylpenicillin	-	-	
Oxacillin	-	-	
Cloxacillin	-	-	
Dicloxacillin	-	-	
Flucloxacillin	-	-	
Mecillinam (uncomplicated UTI only)	-	-	

Cephalosporins	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Cefaclor	-	-	
Cefadroxil	-	-	
Cefalexin	-	-	
Cefazolin	-	-	
Cefepime	-	-	
Cefixime	0.12	0.12	
Cefotaxime	0.12	0.12	
Cefoxitin	-	-	
Cefpodoxime	IE	IE	
Ceftaroline	-	-	
Ceftazidime	-	-	
Ceftibuten	IE	IE	
Ceftriaxone	0.12	0.12	
Cefuroxime iv	-	-	
Cefuroxime oral	-	-	

Carbapenems	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Doripenem	IE	IE	
Ertapenem	IE	IE	
Imipenem	IE	IE	
Meropenem	IE	IE	

Monobactams	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Aztreonam	IE	IE	

Fluoroquinolones[1]	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Ciprofloxacin	0.03	0.06	
Levofloxacin	IE	IE	
Moxifloxacin	IE	IE	
Nalidixic acid (screen)	NA	NA	
Norfloxacin	IE	IE	
Ofloxacin	0.12	0.25	

Aminoglycosides	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Amikacin	-	-	
Gentamicin	-	-	
Netilmicin	-	-	
Tobramycin	-	-	

Glycopeptides	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Teicoplanin	-	-	
Telavancin	-	-	
Vancomycin	-	-	

Macrolides, lincosamides and streptogramins	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Azithromycin	0.25	0.5	
Clarithromycin	-	-	
Erythromycin	-	-	
Roxithromycin	-	-	
Telithromycin	-	-	
Clindamycin	-	-	
Quinupristin-dalfopristin	-	-	

Tetracyclines[1]	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
			1. Isolates susceptible to tetracycline are also susceptible to minocycline, but some isolates resistant to tetracycline may be susceptible to minocycline.
Doxycycline	IE	IE	
Minocycline	IE	IE	
Tetracycline	0.5	1	
Tigecycline	IE	IE	

Miscellaneous agents	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Chloramphenicol	-	-	
Colistin	-	-	
Daptomycin	-	-	
Fosfomycin iv	-	-	
Fosfomycin oral	-	-	
Fusidic acid	-	-	
Linezolid	-	-	
Metronidazole	-	-	
Mupirocin	-	-	
Nitrofurantoin (uncomplicated UTI only)	-	-	
Rifampicin	-	-	
Spectinomycin	64	64	
Trimethoprim (uncomplicated UTI only)	-	-	
Trimethoprim-sulfamethoxazole	-	-	

Neisseria meningitidis

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion criteria for antimicrobial susceptibility testing of *Neisseria meningitidis* have not been defined and an MIC method should be used. If a commercial MIC method is used, follow the manufacturer´s instructions.

Penicillins	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Benzylpenicillin	0.06	0.25	
Ampicillin	0.12	1	
Ampicillin-sulbactam	IE	IE	
Amoxicillin	0.12	1	
Amoxicillin-clavulanate	-	-	
Piperacillin	-	-	
Piperacillin-tazobactam	-	-	
Ticarcillin	-	-	
Ticarcillin-clavulanate	-	-	
Phenoxymethylpenicillin	-	-	
Oxacillin	-	-	
Cloxacillin	-	-	
Dicloxacillin	-	-	
Flucloxacillin	-	-	
Mecillinam (uncomplicated UTI only)	-	-	

Neisseria meningitidis

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Cephalosporins	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Cefaclor	-	-	
Cefadroxil	-	-	
Cefalexin	-	-	
Cefazolin	-	-	
Cefepime	-	-	
Cefixime	-	-	
Cefotaxime	0.12[1]	0.12	**1.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant.
Cefoxitin			
Cefpodoxime	-	-	
Ceftaroline	-	-	
Ceftazidime	-	-	
Ceftibuten	-	-	
Ceftriaxone	0.12[1]	0.12	
Cefuroxime iv	-	-	
Cefuroxime oral	-	-	

Carbapenems	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Doripenem	IE	IE	
Ertapenem	-	-	
Imipenem	-	-	
Meropenem[1]	0.25[2]	0.25	**1.** Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC values above the current resistant breakpoint they should be reported resistant. **2.** Breakpoints relate to meningitis only.

Monobactams	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Aztreonam	-	-	

Fluoroquinolones	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Ciprofloxacin	0.03[1]	0.06[1]	**1.** Breakpoints apply only to use in the prophylaxis of meningococcal disease.
Levofloxacin	IE	IE	
Moxifloxacin	IE	IE	
Nalidixic acid (screen)	NA	NA	
Norfloxacin	-	-	
Ofloxacin	IE	IE	

Aminoglycosides	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Amikacin	-	-	
Gentamicin	-	-	
Netilmicin	-	-	
Tobramycin	-	-	

Glycopeptides	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Teicoplanin	-	-	
Telavancin	-	-	
Vancomycin	-	-	

Neisseria meningitidis

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Macrolides, lincosamides and streptogramins	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Azithromycin	-	-	
Clarithromycin	-	-	
Erythromycin	-	-	
Roxithromycin	-	-	
Telithromycin	-	-	
Clindamycin	-	-	
Quinupristin-dalfopristin	-	-	

Tetracyclines	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Doxycycline	-	-	
Minocycline[1]	1	2	**1.** Tetracycline can be used to predict susceptibility to minocycline for prophylaxis against *N. meningitidis* infections.
Tetracycline	1	2	
Tigecycline	IE	IE	

Miscellaneous agents	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Chloramphenicol	2	4	
Colistin	-	-	
Daptomycin	-	-	
Fosfomycin iv	-	-	
Fosfomycin oral	-	-	
Fusidic acid	-	-	
Linezolid	-	-	
Metronidazole	-	-	
Mupirocin	-	-	
Nitrofurantoin (uncomplicated UTI only)	-	-	
Rifampicin[1]	0.25	0.25	**1.** For prophylaxis of meningitis only (refer to national guidelines).
Spectinomycin	-	-	
Trimethoprim (uncomplicated UTI only)	-	-	
Trimethoprim-sulfamethoxazole	-	-	

Gram-positive anaerobes

except *Clostridium difficile*

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion criteria for antimicrobial susceptibility testing of anaerobes have not yet been defined and an MIC method should be used. If a commercial MIC method is used, follow the manufacturer´s instructions.

Penicillins	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Benzylpenicillin[1]	0.25	0.5	**1.** Susceptibility to ampicillin, amoxicillin and piperacillin without beta-lactamase inhibitors can be inferred from benzylpenicillin.
Ampicillin[1]	4	8	
Ampicillin-sulbactam[1]	4[2]	8[2]	**2.** For susceptibility testing purposes, the concentration of sulbactam is fixed at 4 mg/L.
Amoxicillin[1]	4	8	
Amoxicillin-clavulanate[1]	4[3]	8[3]	**3.** For susceptibility testing purposes, the concentration of clavulanate is fixed at 2 mg/L.
Piperacillin[1]	8	16	
Piperacillin-tazobactam[1]	8[4]	16[4]	**4.** For susceptibility testing purposes, the concentration of tazobactam is fixed at 4 mg/L.
Ticarcillin[1]	8	16	
Ticarcillin-clavulanate[1]	8[3]	16[3]	
Phenoxymethylpenicillin	IE	IE	
Oxacillin	-	-	
Cloxacillin	-	-	
Dicloxacillin	-	-	
Flucloxacillin	-	-	
Mecillinam (uncomplicated UTI only)	-	-	

Gram-positive anaerobes

except *Clostridium difficile*

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Cephalosporins	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Cefaclor	-	-	
Cefadroxil	-	-	
Cefalexin	-	-	
Cefazolin	-	-	
Cefepime	-	-	
Cefixime	-	-	
Cefotaxime	-	-	
Cefoxitin			
Cefpodoxime	-	-	
Ceftaroline	-	-	
Ceftazidime	-	-	
Ceftibuten	-	-	
Ceftriaxone	-	-	
Cefuroxime iv	-	-	
Cefuroxime oral	-	-	

Carbapenems	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Doripenem	1	1	
Ertapenem	1	1	
Imipenem	2	8	
Meropenem	2	8	

Monobactams	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Aztreonam	-	-	

Gram-positive anaerobes

except *Clostridium difficile*

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Fluoroquinolones	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Ciprofloxacin	-	-	
Levofloxacin	-	-	
Moxifloxacin	IE	IE	
Nalidixic acid (screen)	NA	NA	
Norfloxacin	-	-	
Ofloxacin	-	-	

Aminoglycosides	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Amikacin	-	-	
Gentamicin	-	-	
Netilmicin	-	-	
Tobramycin	-	-	

Glycopeptides	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Teicoplanin	IE	IE	
Telavancin	IE	IE	
Vancomycin	2	2	

Gram-positive anaerobes

except *Clostridium difficile*

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Macrolides, lincosamides and streptogramins	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Azithromycin	-	-	
Clarithromycin	-	-	
Erythromycin	IE	IE	
Roxithromycin	-	-	
Telithromycin	-	-	
Clindamycin	4	4	
Quinupristin/dalfopristin	-	-	

Tetracyclines[1]	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
			1. For anaerobic bacteria there is clinical evidence of activity in mixed intra-abdominal infections, but no correlation between MIC values, Pk/Pd data and clinical outcome. Therefore no breakpoints for susceptibility testing are given.
Doxycycline	Note[1]	Note[1]	
Minocycline	Note[1]	Note[1]	
Tetracycline	Note[1]	Note[1]	
Tigecycline	Note[1]	Note[1]	

Miscellaneous agents	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Chloramphenicol	8	8	
Colistin	-	-	
Daptomycin	-	-	
Fosfomycin iv	-	-	
Fosfomycin oral	-	-	
Fusidic acid	-	-	
Linezolid	-	-	
Metronidazole	4	4	
Mupirocin	-	-	
Nitrofurantoin (uncomplicated UTI only)	-	-	
Rifampicin	-	-	
Spectinomycin	-	-	
Trimethoprim (uncomplicated UTI only)	-	-	
Trimethoprim-sulfamethoxazole	-	-	

Clostridium difficile

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion criteria for antimicrobial susceptibility testing of *Clostridium difficile* have not yet been defined and an MIC method should be used. If a commercial MIC method is used, follow the manufacturer´s instructions.

Fluoroquinolones	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Moxifloxacin	-[1]	-[1]	**1.** Not used clinically. May be tested for epidemiological purposes only (ECOFF: WT ≤ 4 mg/L).

Glycopeptides	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Vancomycin	2[1]	2[1]	**1.** The breakpoints are based on epidemiological cut-off values (ECOFFs), which distinguish wild-type isolates from those with reduced susceptibility.

Tetracyclines	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Tigecycline	-[1]	-[1]	**1.** Not used clinically. May be tested for epidemiological purposes only (ECOFF: WT ≤ 0.25 mg/L).

Miscellaneous agents	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Daptomycin	-[1]	-[1]	**1.** Not used clinically. May be tested for epidemiological purposes only (ECOFF: WT ≤ 4 mg/L).
Fusidic acid	-[2]	-[2]	**2.** Not used clinically. May be tested for epidemiological purposes only (ECOFF: WT ≤ 2 mg/L).
Metronidazole	2[3]	2[3]	**3.** The breakpoints are based on epidemiological cut-off values (ECOFFs), which distinguish wild-type isolates from those with reduced susceptibility.
Rifampicin	-[4]	-[4]	**4.** Not used clinically. May be tested for epidemiological purposes only (ECOFF: WT ≤ 0.004 mg/L).

Gram-negative anaerobes

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion criteria for antimicrobial susceptibility testing of anaerobes have not yet been defined and an MIC method should be used. If a commercial MIC method is used, follow the manufacturer´s instructions.

Penicillins	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Benzylpenicillin[1]	0.25	0.5	**1.** Susceptibility to ampicillin, amoxicillin and piperacillin without beta-lactamase inhibitors can be inferred from benzylpenicillin.
Ampicillin[1]	0.5	2	
Ampicillin-sulbactam[1]	4[2]	8[2]	**2.** For susceptibility testing purposes, the concentration of sulbactam is fixed at 4 mg/L.
Amoxicillin[1]	0.5	2	
Amoxicillin-clavulanate[1]	4[3]	8[3]	**3.** For susceptibility testing purposes, the concentration of clavulanate is fixed at 2 mg/L.
Piperacillin[1]	16	16	
Piperacillin-tazobactam[1]	8[4]	16[4]	**4.** For susceptibility testing purposes, the concentration of tazobactam is fixed at 4 mg/L.
Ticarcillin[1]	16	16	
Ticarcillin-clavulanate[1]	8[3]	16[3]	
Phenoxymethylpenicillin	IE	IE	
Oxacillin	-	-	
Cloxacillin	-	-	
Dicloxacillin	-	-	
Flucloxacillin	-	-	
Mecillinam (uncomplicated UTI only)	-	-	

Cephalosporins	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Cefaclor	-	-	
Cefadroxil	-	-	
Cefalexin	-	-	
Cefazolin	-	-	
Cefepime	-	-	
Cefixime	-	-	
Cefotaxime	-	-	
Cefoxitin	NA	NA	
Cefpodoxime	-	-	
Ceftaroline	-	-	
Ceftazidime	-	-	
Ceftibuten	-	-	
Ceftriaxone	-	-	
Cefuroxime iv	-	-	
Cefuroxime oral	-	-	

Carbapenems	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Doripenem	1	1	
Ertapenem	1	1	
Imipenem	2	8	
Meropenem	2	8	

Monobactams	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Aztreonam	-	-	

Fluoroquinolones	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Ciprofloxacin	-	-	
Levofloxacin	-	-	
Moxifloxacin	IE	IE	
Nalidixic acid (screen)	NA	NA	
Norfloxacin	-	-	
Ofloxacin	-	-	

Aminoglycosides	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Amikacin	-	-	
Gentamicin	-	-	
Netilmicin	-	-	
Tobramycin	-	-	

Glycopeptides	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Teicoplanin	-	-	
Telavancin	-	-	
Vancomycin	-	-	

Macrolides, lincosamides and streptogramins	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Azithromycin	-	-	
Clarithromycin	-	-	
Erythromycin	IE	IE	
Roxithromycin	-	-	
Telithromycin	-	-	
Clindamycin	4	4	
Quinupristin/dalfopristin	-	-	

Tetracyclines[1]	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
			1. For anaerobic bacteria there is clinical evidence of activity in mixed intra-abdominal infections, but no correlation between MIC values, Pk/Pd data and clinical outcome. Therefore no breakpoints for susceptibility testing are given.
Doxycycline	Note[1]	Note[1]	
Minocycline	Note[1]	Note[1]	
Tetracycline	Note[1]	Note[1]	
Tigecycline	Note[1]	Note[1]	

Miscellaneous agents	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Chloramphenicol	8	8	
Colistin	-	-	
Daptomycin	-	-	
Fosfomycin iv	-	-	
Fosfomycin oral	-	-	
Fusidic acid	-	-	
Linezolid	-	-	
Metronidazole	4	4	
Mupirocin	-	-	
Nitrofurantoin (uncomplicated UTI only)	-	-	
Rifampicin	-	-	
Spectinomycin	-	-	
Trimethoprim (uncomplicated UTI only)	-	-	
Trimethoprim-sulfamethoxazole	-	-	

Helicobacter pylori

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion criteria for antimicrobial susceptibility testing of *Helicobacter pylori* have not been defined and an MIC method should be used. If a commercial MIC method is used, follow the manufacturer´s instructions.

Penicillins	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Amoxicillin	0.12[1]	0.12[1]	**1.** The breakpoints are based on epidemiological cut-off values (ECOFFs), which distinguish wild-type isolates from those with reduced susceptibility.

Fluoroquinolones	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Levofloxacin	1[1]	1[1]	**1.** The breakpoints are based on epidemiological cut-off values (ECOFFs), which distinguish wild-type isolates from those with reduced susceptibility.

Macrolides	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Clarithromycin	0.25[1]	0.5[1]	**1.** The breakpoints are based on epidemiological cut-off values (ECOFFs), which distinguish wild-type isolates from those with reduced susceptibility.

Tetracyclines	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Tetracycline	1[1]	1[1]	**1.** The breakpoints are based on epidemiological cut-off values (ECOFFs), which distinguish wild-type isolates from those with reduced susceptibility.

Miscellaneous agents	MIC breakpoint (mg/L)		Notes Numbers for comments on MIC breakpoints
	S ≤	R >	
Metronidazole	8[1]	8[1]	**1.** The breakpoints are based on epidemiological cut-off values (ECOFFs), which distinguish wild-type isolates from those with reduced susceptibility.
Rifampicin	1[1]	1[1]	

Listeria monocytogenes

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Mueller-Hinton agar + 5% defibrinated horse blood and 20 mg/L β-NAD (MH-F)
Inoculum: McFarland 0.5
Incubation: 5% CO_2, 35±1ºC, 18±2h
Reading: Read zone edges as the point showing no growth viewed from the front of the plate with the lid removed and with reflected light.
Quality control: *Streptococcus pneumoniae* ATCC 49619

Penicillins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Benzylpenicillin	1	1	1 unit	13	13	
Ampicillin	1	1	2	16	16	

Carbapenems	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Meropenem	0.25	0.25	10	26	26	

Macrolides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Erythromycin	1	1	15	25	25	

Miscellaneous agents	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Trimethoprim-sulfamethoxazole[1]	0.06	0.06	1.25-23.75	29	29	**1.** Trimethoprim-sulfamethoxazole in the ratio 1:19. Breakpoints are expressed as the trimethoprim concentration.

Pasteurella multocida

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Mueller-Hinton agar + 5% defibrinated horse blood and 20 mg/L β-NAD (MH-F)
Inoculum: McFarland 0.5
Incubation: 5% CO_2, 35±1ºC, 18±2h
Reading: Read zone edges as the point showing no growth viewed from the front of the plate with the lid removed and with reflected light.
Quality control: *Streptococcus pneumoniae* ATCC 49619

Penicillins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Benzylpenicillin	0.5	0.5	1 unit	17	17	
Ampicillin	1	1	2	17	17	
Amoxicillin	1	1		Note[A]	Note[A]	**A.** Susceptibility inferred from ampicillin.
Amoxicillin-clavulanate	1	1	2-1	15	15	

Cephalosporins	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Cefotaxime	0.03	0.03	5	26	26	

Fluoroquinolones	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Ciprofloxacin	0.06	0.06	5	27[A]	27[A]	**A.** The nalidixic acid disk diffusion test can be used to screen for fluoroquinolone resistance. Isolates categorised as susceptible can be reported susceptible to ciprofloxacin and lecvofloxacin. Isolates categorised as non-susceptible may have fluoroquinolone resistance and should be tested against the appropriate agent.
Levofloxacin	0.06	0.06	5	27[A]	27[A]	
Nalidixic acid (screen)	NA	NA	30	23[A]	Note[A]	

Pasteurella multocida

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Tetracyclines	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doxycycline	1	1		Note[A]	Note[A]	**A.** Susceptibility inferred from tetracycline screen test.
Tetracycline (screen)	NA	NA	**30**	24[A]	24[A]	

Miscellaneous agents	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Trimethoprim-sulfamethoxazole[1]	0.25	0.25	**1.25-23.75**	23	23	**1.** Trimethoprim-sulfamethoxazole in the ratio 1:19. Breakpoints are expressed as the trimethoprim concentration.

Campylobacter jejuni and *coli*

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Disk diffusion (EUCAST standardised disk diffusion method)
Medium: Mueller-Hinton agar + 5% defibrinated horse blood and 20 mg/L β-NAD (MH-F). The MH-F plates should be dried prior to inoculation to reduce swarming (at 20-25°C over night or at 35°C, with the lid removed, for 15 min).
Inoculum: McFarland 0.5
Incubation: Microaerobic environment, 41±1ºC, 24h. Isolates with insufficient growth after 24 h incubation are reincubated immediately and inhibition zones read after a total of 40-48 h incubation.
Reading: Read zone edges as the point showing no growth viewed from the front of the plate with the lid removed and with reflected light.
Quality control: *Campylobacter jejuni* ATCC 33560

Fluoroquinolones	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Ciprofloxacin	0.5	0.5	**5**	26	26	

Macrolides	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Azithromycin	Note[1]	Note[1]		Note[A]	Note[A]	**1/A.** Erythromycin can be used to determine susceptibility to azithromycin and clarithromycin.
Clarithromycin	Note[1]	Note[1]		Note[A]	Note[A]	
Erythromycin, *C. jejuni*	4[1]	4[1]	**15**	20[A]	20[A]	
Erythromycin, *C. coli*	8[1]	8[1]	**15**	24[A]	24[A]	

Tetracyclines	MIC breakpoint (mg/L)		Disk content (µg)	Zone diameter breakpoint (mm)		Notes Numbers for comments on MIC breakpoints Letters for comments on disk diffusion
	S ≤	R >		S ≥	R <	
Doxycycline	Note[1]	Note[1]		Note[A]	Note[A]	**1/A.** Tetracycline can be used to determine susceptibility to doxycycline.
Tetracycline	2[1]	2[1]	**30**	30[A]	30[A]	

PK/PD (Non-species related) breakpoints

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

These breakpoints should not be used when there are species specific breakpoints, such as values, Note or "-" in the tables.

Penicillins	MIC breakpoint (mg/L)		PK/PD (Non-species related) breakpoints are based on the following dosages (See section 8 in Rationale Documents)
	S ≤	R >	
Benzylpenicillin	0.25	2	The non-species related S/I and I/R breakpoints are based on 600 mg x 4 (2.4 g/day) and 2.4 g x 6 (14.4 g/day) doses respectively.
Ampicillin	2	8	The non-species related breakpoints are based on doses of at least 0.5 g x 3-4 (1.5-2 g/day).
Ampicillin-sulbactam	2	8	Rationale document in preparation.
Amoxicillin	2	8	The non-species related breakpoints are based on doses of at least 0.5 g x 3-4 (1.5-2 g/day).
Amoxicillin-clavulanate	2	8	Rationale document in preparation.
Piperacillin	4	16	Breakpoints apply to piperacillin-tazobactam dosage of 4 g x 3.
Piperacillin-tazobactam	4	16	Breakpoints apply to piperacillin-tazobactam dosage of 4 g x 3.
Ticarcillin	8	16	
Ticarcillin-clavulanate	8	16	
Phenoxymethylpenicillin	IE	IE	
Oxacillin	IE	IE	
Cloxacillin	IE	IE	
Dicloxacillin	IE	IE	
Flucloxacillin	IE	IE	
Mecillinam	IE	IE	

PK/PD (Non-species related) breakpoints

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Cephalosporins	MIC breakpoint (mg/L)		PK/PD (Non-species related) breakpoints are based on the following dosages (See section 8 in Rationale Documents)
	S ≤	R >	
Cefaclor	IE	IE	
Cefadroxil	IE	IE	
Cefalexin	IE	IE	
Cefazolin	1	2	Rationale document in preparation.
Cefepime	4	8	Breakpoints apply to a daily intravenous dose of 2 g x 2 and a high dose of at least 2 g x 3.
Cefixime	IE	IE	
Cefotaxime	1	2	Breakpoints apply to a daily intravenous dose of 1 g x 3 and a high dose of at least 2 g x 3.
Cefoxitin	IE	IE	
Cefpodoxime	IE	IE	
Ceftaroline	0.5	0.5	Based on Pk/Pd target for Gram-negative organisms. Breakpoints apply to a daily intravenous infusion over 1 h of 600 mg x 2.
Ceftazidime	4	8	Breakpoints apply to a daily intravenous dose of 1 g x 3 and a high dose of at least 2 g x 3.
Ceftibuten	IE	IE	
Ceftriaxone	1	2	Breakpoints apply to a daily intravenous dose of 1 g x 1 and a high dose of at least 2 g x 1.
Cefuroxime iv	4	8	Breakpoints apply to a daily intravenous dose of 750 mg x 3 and a high dose of at least 1.5 g x 3.
Cefuroxime oral	IE	IE	

Carbapenems	MIC breakpoint (mg/L)		PK/PD (Non-species related) breakpoints are based on the following dosages (See section 8 in Rationale Documents)
	S ≤	R >	
Doripenem	1	4	Breakpoints apply to doripenem 500 mg x 3 daily administered intravenously over 1 hour as the lowest dose. 500 mg x 3 daily administered over 4 hours was taken into consideration for severe infections and in setting the I/R breakpoint.
Ertapenem	0.5	1	Breakpoints apply to ertapenem 1000 mg x 1 daily administered intravenously over 30 minutes as the only dose.
Imipenem	2	8	Breakpoints apply to imipenem 500 mg x 4 daily administered intravenously over 30 minutes as the lowest dose. 1 g x 4 daily was taken into consideration for severe infections and in setting the I/R breakpoint.
Meropenem	2	8	Breakpoints apply to meropenem 1000 mg x 3 daily administered intravenously over 30 minutes as the lowest dose. 2 g x 3 daily was taken into consideration for severe infections and in setting the I/R breakpoint.

Monobactams	MIC breakpoint (mg/L)		PK/PD (Non-species related) breakpoints are based on the following dosages (See section 8 in Rationale Documents)
	S ≤	R >	
Aztreonam	4	8	Rationale document in preparation.

PK/PD (Non-species related) breakpoints

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Fluoroquinolones	MIC breakpoint (mg/L)		PK/PD (Non-species related) breakpoints are based on the following dosages (See section 8 in Rationale Documents)
	S ≤	R >	
Ciprofloxacin	0.5	1	Breakpoints apply to an oral dose of 500 mg x 2 (or as low as 250 mg x 2 for uncomplicated urinary tract infections) to 750 mg x 2 and an intravenous dose of 400 mg x 2 to 400 mg x 3.
Levofloxacin	1	2	Breakpoints apply to an oral dose of 500 mg x 1 to 500 mg x 2 and an intravenous dose of 500 mg x 1 to 500 mg x 2.
Moxifloxacin	0.5	1	Breakpoints apply to an oral and iv dose of 400 mg x 1.
Nalidixic acid	IE	IE	
Norfloxacin	0.5	1	Breakpoints apply to an oral dose of 400 mg x 2.
Ofloxacin	0.5	1	Breakpoints apply to an oral dose of 200 mg x 2 to 400 mg x 2 and an intravenous dose of 200 mg x 2 to 400 mg x 2.

Aminoglycosides	MIC breakpoint (mg/L)		PK/PD (Non-species related) breakpoints are based on the following dosages (See section 8 in Rationale Documents)
	S ≤	R >	
Amikacin	8	16	Breakpoints apply to intravenous amikacin dosage of 15 mg/kg/day. In the absence of Pk/Pd data these have been determined mainly on the basis of Pk data and pre-existing breakpoints.
Gentamicin	2	4	Breakpoints apply to intravenous gentamicin dosage of 3-4.5 mg/kg/day. In the absence of Pk/Pd data these have been determined mainly on the basis of Pk data and pre-existing breakpoints.
Netilmicin	2	4	Breakpoints apply to intravenous netilmicin dosage of 4-6 mg/kg/day. In the absence of Pk/Pd data these have been determined mainly on the basis of Pk data and pre-existing breakpoints.
Tobramycin	2	4	Breakpoints apply to intravenous tobramycin dosage of 3-4.5 mg/kg/day. In the absence of Pk/Pd data these have been determined mainly on the basis of Pk data and pre-existing breakpoints.

Glycopeptides	MIC breakpoint (mg/L)		PK/PD (Non-species related) breakpoints are based on the following dosages (See section 8 in Rationale Documents)
	S ≤	R >	
Teicoplanin	IE	IE	
Telavancin	IE	IE	
Vancomycin	IE	IE	

PK/PD (Non-species related) breakpoints

EUCAST Clinical Breakpoint Table v. 3.1, valid from 2013-02-11

Macrolides, lincosamides and streptogramins	MIC breakpoint (mg/L)		PK/PD (Non-species related) breakpoints are based on the following dosages (See section 8 in Rationale Documents)
	S ≤	R >	
Azithromycin	IE	IE	
Clarithromycin	IE	IE	
Erythromycin	IE	IE	
Roxithromycin	IE	IE	
Telithromycin	IE	IE	
Clindamycin	IE	IE	
Quinupristin/dalfopristin	IE	IE	

Tetracyclines	MIC breakpoint (mg/L)		PK/PD (Non-species related) breakpoints are based on the following dosages (See section 8 in Rationale Documents)
	S ≤	R >	
Doxycycline	IE	IE	
Minocycline	IE	IE	
Tetracycline	IE	IE	
Tigecycline	0.25	0.5	Breakpoints apply to a tigecycline intravenous dose of 100 mg followed by 50 mg 12 hourly for CSSSI and CIAI.

Miscellaneous	MIC breakpoint (mg/L)		PK/PD (Non-species related) breakpoints are based on the following dosages (See section 8 in Rationale Documents)
	S ≤	R >	
Chloramphenicol	IE	IE	
Colistin	IE	IE	
Daptomycin	IE	IE	
Fosfomycin iv	IE	IE	
Fosfomycin oral	IE	IE	
Fusidic acid	IE	IE	
Linezolid	2	4	Breakpoints apply to a linezolid intravenous and oral dosage of 600 mg x 2.
Metronidazole	IE	IE	
Mupirocin	IE	IE	
Nitrofurantoin	IE	IE	
Rifampicin	IE	IE	
Spectinomycin	IE	IE	
Trimethoprim	IE	IE	
Trimethoprim-sulfamethoxazole	IE	IE	