CDS Workshop

CDS handout – ASM 2008

Melbourne

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Quality Assurance

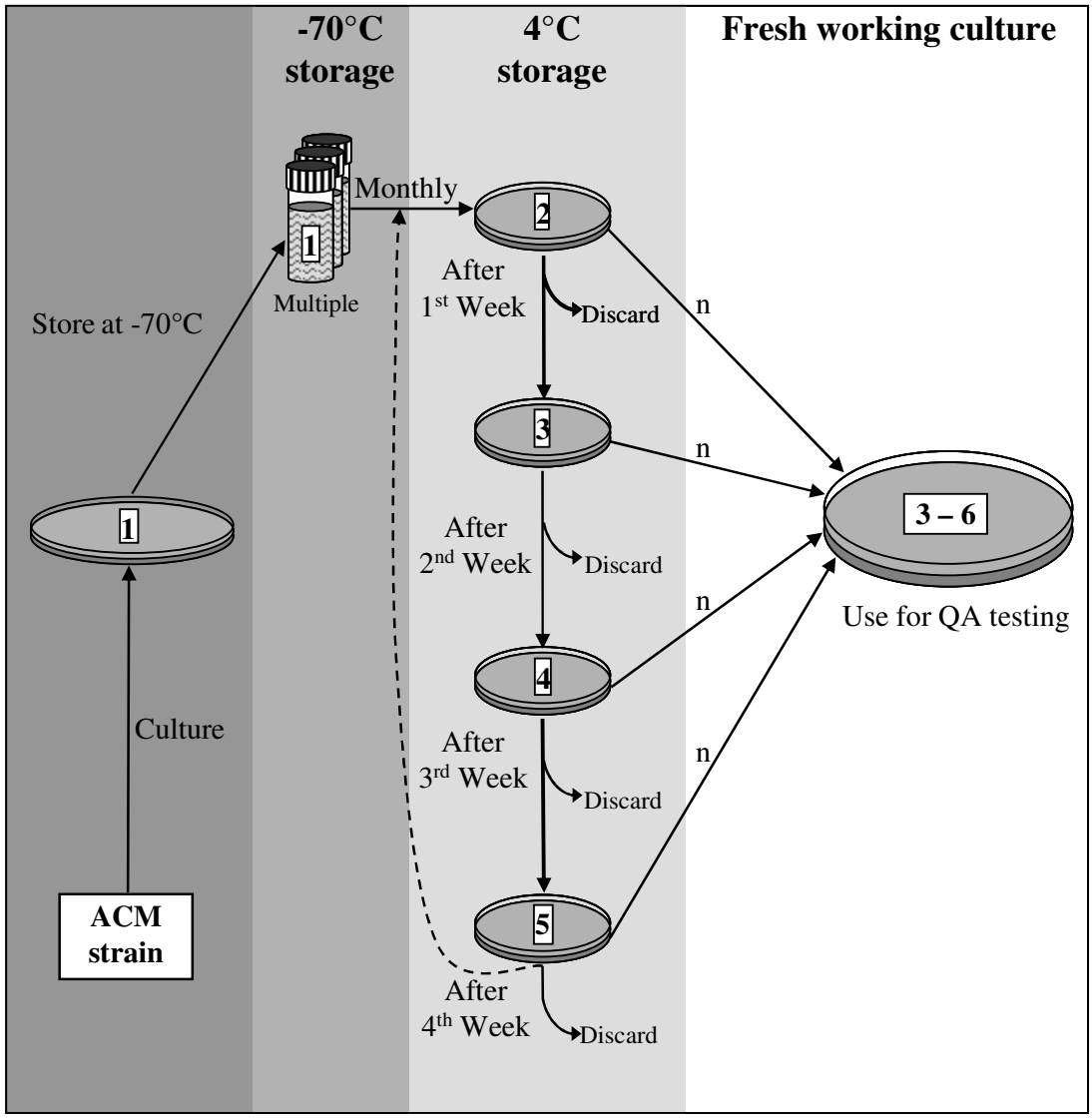

Figure 1: -70°C storage and recovery of reference cultures.

Subcultures held at 4°C may be used as temporary stock cultures for up to one week through each of four successive re-passages.
n = Any number of subcultures may be made directly from the 4°C temporary stock cultures.
Boxed numbers indicate the number of passages each culture is removed from the received ACM reference strain.

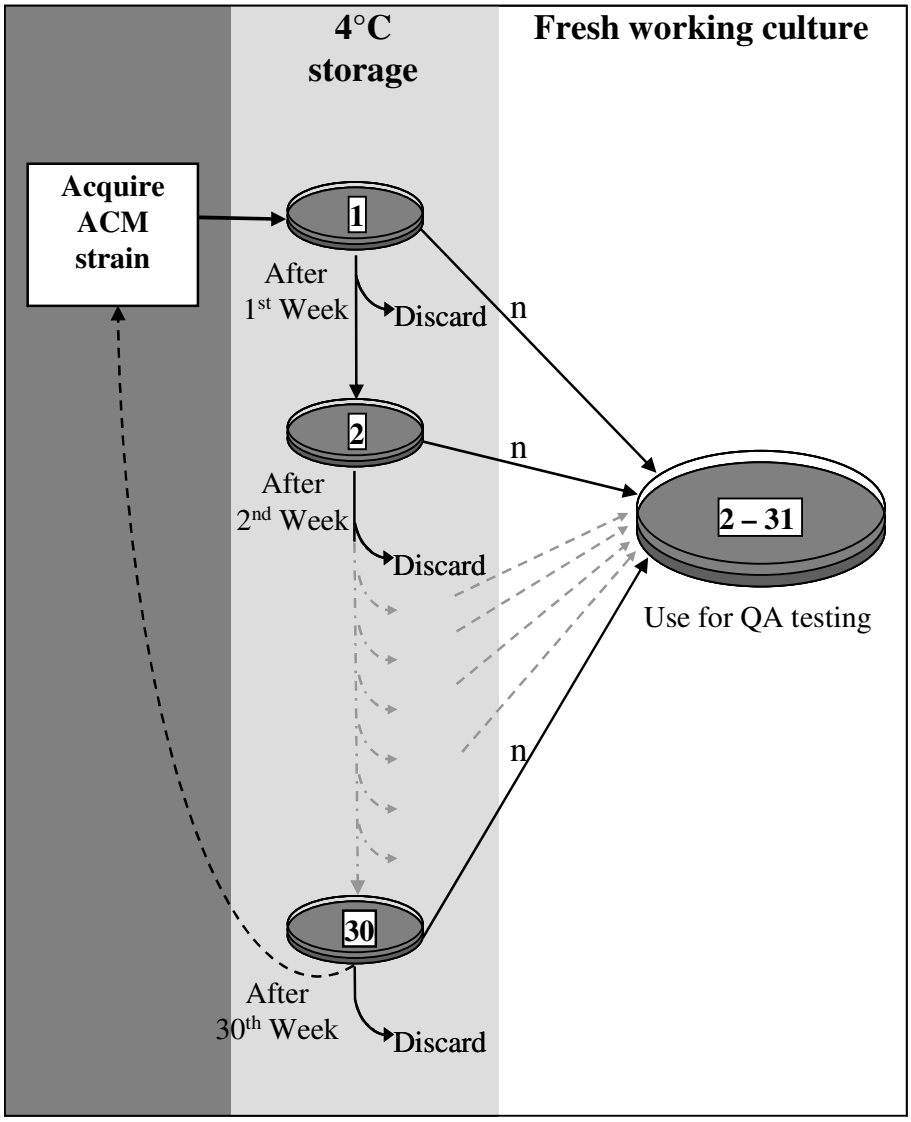

Figure 2: 4°C Storage and recovery of reference organisms in the absence of -70°C storage facilities.

n = Any number of subcultures may be made directly from the 4°C temporary stock cultures.
Boxed numbers indicate the number of passages each culture is removed from the received ACM reference strain.

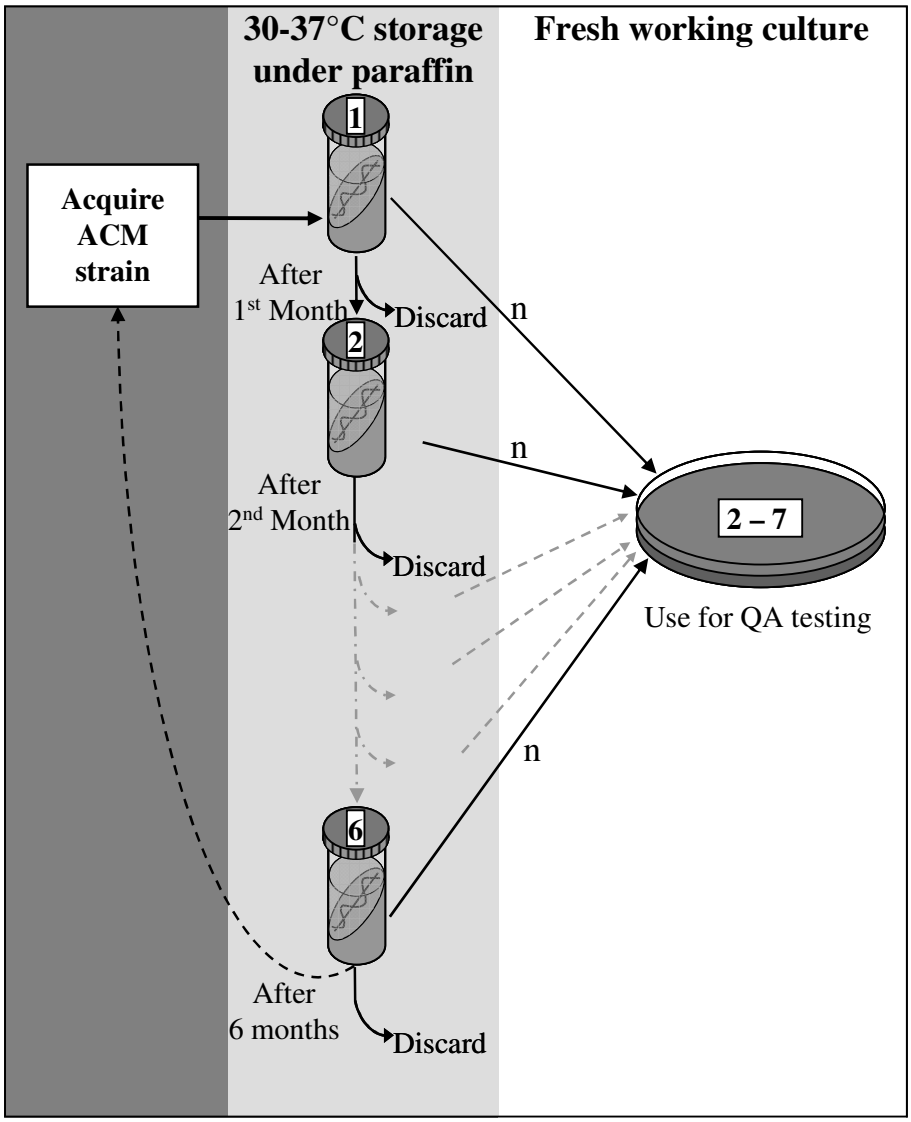

Figure 3: Storage and recovery of *Neisseria gonorrhoeae* in the absence of -70°C storage facilities.

n = Any number of subcultures may be made directly from the paraffin covered stock cultures.
Boxed numbers indicate the number of passages each culture is removed from the received ACM reference strain.

Tables

1. Calibrations

Table 1.a. Calibrations: *Gram Positive Organisms*

Antibiotics, disc potencies, annular radii and MIC for susceptible strains, media and incubation conditions.

Antibiotic	Disc potency (µg)	Exception to the standard interpretation [a]	MIC (mg/L)
***Corynebacterium* species (Blood Sensitest, CO_2, 35-37°C)[b]**			
Ampicillin[c]	5		≤ 2
Benzylpenicillin	0.5 units		≤ 0.125
Chloramphenicol	30		≤ 8
Ciprofloxacin	2.5		≤ 1
Clindamycin	2		≤ 0.5
Erythromycin	5		≤ 0.5
Fusidic acid	2.5		≤ 0.5
Moxifloxacin/Gatifloxacin	2.5		≤ 1
Pristinamycin	15		≤ 2
Quinupristin/Dalfopristin	15		≤ 2
Rifampicin	1		≤ 0.5
Teicoplanin	15	2 mm	≤ 8
Tetracycline	10		≤ 4
Tigecycline	15		≤ 1
Vancomycin	5	2 mm	≤ 4
Enterococci (Blood Sensitest, CO_2, 35-37°C)			
Ampicillin[d]	5[d]	4 mm[d]	≤ 4
Chloramphenicol	30	4 mm	≤ 8
Gentamicin	200		≤ 256
Linezolid	10		≤ 4
Nitrofurantoin[e]	200	4 mm	≤ 64
Pristinamycin[f]	15		≤ 2
Quinupristin/Dalfopristin[f]	15		≤ 2
Streptomycin	300	4 mm	≤ 512
Teicoplanin	15	2 mm	≤ 8
Tigecycline	15		≤ 1
Vancomycin	5	(See foot note)[g]	≤ 4
***Listeria* species (Blood Sensitest, CO_2, 35-37°C)**			
Ampicillin	5		≤ 1
Co-trimoxazole	25		≤ 0.5/9.5
Gentamicin	10		≤ 1

[a] The standard 6 mm cut-off applies where no exception has been specified.

[b] Slow growers are incubated for 48h.

[c] If a *Corynebacterium* species is resistant to benzylpenicillin 0.5 units, test ampicillin 5 µg.

[d] Perform a nitrocefin based test to detect β–lactamase activity if the zone of inhibition has a sharp edge and an annular radius > 4 mm. β–Lactamase–positive isolates are reported as resistant.

[e] For testing urine isolates only.

[f] *Enterococcus faecalis* is intrinsically resistant to Pristinamycin and Quinupristin/Dalfopristin.

[g] A zone of inhibition with a hazy edge indicates low level resistance to Vancomycin (VanB type), irrespective of the size of the inhibitory zone. The hazy edge will be more evident if the plate reincubated for a total of 48 hours.

Table 1.a. Calibrations: *Gram Positive Organisms* cont.

Antibiotics, disc potencies, annular radii and MIC for susceptible strains, media and incubation conditions.

Antibiotic	Disc potency (µg)	Exception to the standard interpretation [a]	MIC (mg/L)
Staphylococci (Sensitest, Air 35-37°C)			
Ampicillin[h]	5		≤ 0.5
Benzylpenicillin[i]	0.5 units		≤ 0.06
Cefoxitin[j]	10		≤ 4
Cephalexin[h]	100		≤ 16
Chloramphenicol	30		≤ 8
Ciprofloxacin	2.5		≤ 1
Clindamycin	2		≤ 0.5
Co-trimoxazole	25		≤ 1/19
Erythromycin	5		≤ 0.5
Fusidic acid	2.5		≤ 0.5
Gentamicin	10		≤ 1
Kanamycin	50		≤ 8
Linezolid	10		≤ 4
Moxifloxacin/Gatifloxacin	2.5		≤ 1
Mupirocin	5		≤ 2
Neomycin[k]	30		≤ 4
Nitrofurantoin[e]	200		≤ 32
Novobiocin[k]	5		≤ 1
Oxacillin[l]	1		≤ 0.25
Pristinamycin	15		≤ 2
Quinupristin/Dalfopristin	15		≤ 2
Rifampicin	1		≤ 0.5
Sulphafurazole	300		≤ 64
Teicoplanin	15	2 mm	≤ 8
Tetracycline	10		≤ 4
Tigecycline	15		≤ 1
Trimethoprim	5		≤ 4
Vancomycin	5	2 mm	≤ 4

[a] The standard 6 mm cut-off applies where no exception has been specified.
[e] For testing urine isolates only.
[h] For testing *Staphylococcus saprophyticus* ONLY.
[i] Not for testing *Staphylococcus saprophyticus*.
[j] For testing Staphylococcus aureus ONLY.
[k] Antibiotic calibrated for veterinary medicine.
[l] For testing coagulase-negative staphylococci (except *Staphylococcus saprophyticus*).

Table 1.a. Calibrations: *Gram Positive Organisms* cont.

Antibiotics, disc potencies, annular radii and MIC for susceptible strains, media and incubation conditions.

Antibiotic	Disc potency (µg)	Exception to the standard interpretation [a]	MIC (mg/L)
Streptococci & *Erysipelothrix* species (Blood Sensitest, CO_2, 35-37°C)			
Ampicillin[m]	5	4 mm	≤ 2
Benzylpenicillin	0.5 units		≤ 0.125
Cefotaxime	0.5		≤ 0.25
Cefotaxime[m]	5		≤ 2
Ceftriaxone	0.5		≤ 0.25
Ceftriaxone[m]	5		≤ 2
Chloramphenicol	30		≤ 8
Clindamycin	2		≤ 0.5
Co-trimoxazole	25		≤ 0.5/9.5
Erythromycin	5		≤ 0.5
Moxifloxacin/Gatifloxacin	2.5	4 mm	≤ 1
Nitrofurantoin[e]	200		≤ 32
Pristinamycin	15		≤ 2
Quinupristin/Dalfopristin	15		≤ 2
Rifampicin	1		≤ 0.5
Teicoplanin	15	2 mm	≤ 8
Tetracycline	10		≤ 4
Tigecycline	15		≤ 1
Vancomycin	5	2 mm	≤ 4

[a] The standard 6 mm cut-off applies where no exception has been specified.

[e] For testing urine isolates only

[m] NOT for testing *Streptococcus pneumoniae* from CSF. If *Streptococcus pneumoniae* or any other *Streptococcus* species from a site other than CSF is resistant to benzylpenicillin 0.5 units, cefotaxime 0.5 µg or ceftriaxone 0.5 µg then test ampicillin 5 µg, cefotaxime 5 µg and ceftriaxone 5 µg.

Table 1.b. Calibrations: *Gram Negative Organisms*

Antibiotics, disc potencies, annular radii and MIC for susceptible strains, media and incubation conditions.

Antibiotic	Disc potency (µg)	Exception to the standard interpretation [a]	MIC (mg/L)
***Acinetobacter* species, Enterobacteriaceae & Vibrionaceae (Sensitest, air, 35-37°C)[b]**			
Amikacin	30	4 mm[c]	≤ 16[c]
Ampicillin	25		≤ 8
Apramicin[d]	15		≤ 8
Augmentin[e]	60		≤ 16/8
Aztreonam	30		≤ 8
Cefazolin	30		≤ 16
Cefepime	10		≤ 2
Cefotaxime	5		≤ 1
Cefotetan	30		≤ 8
Cefoxitin	30		≤ 8
Cefpirome	10		≤ 2
Cefpodoxime	10		≤ 2
Ceftazidime	10		≤ 4
Ceftriaxone	5		≤ 1
Cefuroxime	30		≤ 8
Cephalexin	100		≤ 16
Chloramphenicol	30		≤ 8
Ciprofloxacin	2.5		≤ 1
Enoxacin	10		≤ 4
Ertapenem[f]	10		≤ 4
Gentamicin	10	4 mm	≤ 2
Imipenem	10		≤ 4
Kanamycin	50		≤ 8
Meropenem	5		≤ 2
Moxifloxacin/Gatifloxacin	2.5		≤ 1
Nalidixic acid[g]	30		≤ 4
Neomycin[d]	30		≤ 4
Nitrofurantoin[g]	200		≤ 32
Norfloxacin [g]	10		≤ 4
Polymyxin B	300 units	4 mm	≤ 1
Spectinomycin[d]	25		≤ 32
Streptomycin[d]	25		≤ 16
Sulphafurazole	300		≤ 64
Tazocin[e]	55		≤ 16/2
Tetracycline	10	4 mm	≤ 4.0
Tigecycline	15		≤ 1
Timentin[e]	85		≤ 32/2
Tobramycin	10	4 mm	≤ 2
Trimethoprim	5		≤ 4

[a] The standard 6 mm cut-off applies where no exception has been specified.
[b] *Yersinia enterocolitica* is incubated in air at 30° C.
[c] Revised calibration, 2006.
[d] Antibiotic calibrated for veterinary medicine.
[e] If an ESBL is present, report Augmentin, Timentin and Tazocin for isolates from URINE ONLY.
[f] *Acinetobacter* species are considered resistant to ertapenem.
[g] For testing urinary isolates only.

Table 1.b. Calibrations: *Gram Negative Organisms* cont.

Antibiotics, disc potencies, annular radii and MIC for susceptible strains, media and incubation conditions.

Antibiotic	Disc potency (µg)	Exception to the standard interpretation [a]	MIC (mg/L)
Branhamella catarrhalis (Moraxella catarrhalis)			
(Blood Sensitest, 5% CO_2, 35-37°C)			
Benzylpenicillin	0.5 units		≤ 0.25
Cefaclor	30		≤ 4
Cefpodoxime	10		≤ 2
Cefuroxime	30		≤ 4
Chloramphenicol	10		≤ 4
Ciprofloxacin	2.5		≤ 1
Co-trimoxazole	25		≤ 1/19
Erythromycin	5		≤ 0.5
Moxifloxacin/Gatifloxacin	2.5		≤ 1
Tetracycline	10		≤ 4
***Campylobacter* species**			
(Blood Sensitest, microaerophilic, 42°C)			
Ciprofloxacin	2.5		≤ 1
Erythromycin	5	4 mm	≤ 0.5
Gentamicin	10		≤ 1
Tetracycline	10		≤ 4
***Haemophilus* species**			
(HTM agar[h], 5% CO_2, 35-37°C)			
Ampicillin	5		≤ 1
Augmentin	15		≤ 2/1
Cefaclor	30		≤ 4
Cefotaxime	0.5		≤ 0.25
Cefpodoxime	10		≤ 2
Ceftriaxone	0.5		≤ 0.25
Cefuroxime	30		≤ 4
Chloramphenicol	10		≤ 2
Ciprofloxacin	2.5		≤ 1
Co-trimoxazole	25		≤ 1/19
Moxifloxacin/Gatifloxacin	2.5		≤ 1
Tetracycline	10		≤ 4
Helicobacter pylori			
(Chocolate Columbia Blood Agar, microaerophilic, 35-37°C)			
Amoxycillin	2		≤ 1
Ciprofloxacin	2.5		≤ 1
Erythromycin[i]	5		≤ 0.5
Metronidazole	5		≤ 4
Rifampicin[j]	5		≤ 2
Tetracycline	10		≤ 4

[a] The standard 6 mm cut-off applies where no exception has been specified.

[h] Haemophilus Test Medium Base containing 15 mg/L of freshly prepared haematin and NAD.

[i] Erythromycin 5 µg is the surrogate disc for reporting the susceptibility to clarithromycin. The MIC of clarithromycin for susceptible strains is ≤ 0.5 mg/L.

[j] Rifampicin 5 µg is the surrogate disc for reporting the susceptibility to rifabutin.

Table 1.b. Calibrations: *Gram Negative Organisms* cont.

Antibiotics, disc potencies, annular radii and MIC for susceptible strains, media and incubation conditions.

Antibiotic	Disc potency (µg)	Exception to the standard interpretation [a]		MIC (mg/L)
Neisseria gonorrhoeae [k]				
(Chocolate Columbia Blood Agar, 5% CO2, 35-37°C, humidity > 80%)				
Benzylpenicillin	0.5 units			
Susceptible [k]		> 9		≤ 0.03
Less susceptible [k]		4 – 9		0.06 – 0.5
Resistant [k]		≤ 3		≥ 1
Ceftriaxone	0.5			
Susceptible [k]		> 8		≤ 0.03
Less susceptible [k]		5 – 7		0.06 – 0.25
Resistant [k]		–		–
Ciprofloxacin/Nalidixic acid	CIP 1 / NA 30	CIP 1	NA 30	
Susceptible [k]		≥ 6	≥ 6	≤ 0.03 [l]
Less susceptible [k]		> 6	< 6	0.06 – 0.5 [l]
Resistant [k]		≤ 6	< 6	≥ 1 [l]
Spectinomycin	100			
Susceptible [k]		≥ 6		≤ 64
Less susceptible [k]		–		–
Resistant [k]		0		≥ 128
Neisseria meningitidis				
(Blood Sensitest, 5% CO2, 35-37°C)				
Benzylpenicillin	0.5 units	4 mm		≤ 0.25
Cefotaxime	0.5			≤ 0.25
Ceftriaxone	0.5			≤ 0.25
Chloramphenicol	10			≤ 2
Ciprofloxacin	2.5			≤ 1
Rifampicin	1			≤ 0.5
***Pasteurella* species**				
(Blood Sensitest, 5% CO2, 35-37°C)				
Ampicillin [m]	5			≤ 2
Benzylpenicillin	0.5 units	4 mm		≤ 0.25
Ciprofloxacin	2.5			≤ 1
Moxifloxacin/Gatifloxacin	2.5			≤ 1
Tetracycline	10			≤ 4

[a] The standard 6 mm cut-off applies where no exception has been specified.

[k] *Neisseria gonorrhoeae* sensitivity interpretation:

Susceptible – A cure is expected following treatment with standard doses.

Less Susceptible – Quinolone agents: A cure would be expected following high oral dose regimens e.g. 500 mg ciprofloxacin, but treatment failure from lower doses.
Penicillin Group: A cure would be expected with the standard regimens used to treat male urethral gonorrhoea (e.g. a single oral dose of 3g amoxycillin), but treatment failure may occur for other infected sites e.g. endocervix, pharynx and rectum.

Resistant – There is a high probability of treatment failure using current dose recommendations.

[l] MICs for ciprofloxacin.

[m] *Pasteurella multocida* is tested against ampicillin 5 µg and NOT benzylpenicillin 0.5 units.

Table 1.b. Calibrations: *Gram Negative Organisms* cont.

Antibiotics, disc potencies, annular radii and MIC for susceptible strains, media and incubation conditions.

Antibiotic	Disc potency (μg)	Exception to the standard interpretation [a]	MIC (mg/L)
***Pseudomonas* species, *Burkholderia* species & *Chryseobacterium* species (Sensitest, air, 35-37°C)**			
Amikacin	30	4 mm	≤ 16
Augmentin[n]	60		≤ 8/4
Aztreonam	30		≤ 8
Cefepime	10		≤ 2
Cefpirome	10		≤ 2
Ceftazidime	10		≤ 4
Ciprofloxacin	2.5		≤ 1
Ertapenem	10		≤ 4
Gentamicin	10	4 mm	≤ 4
Imipenem	10		≤ 4
Meropenem	5		≤ 2
Moxifloxacin/Gatifloxacin	2.5		≤ 1
Norfloxacin[g]	10		≤ 4
Piperacillin	50		≤ 16
Polymyxin B	300 units	4 mm	≤ 1
Sulphafurazole	300		≤ 64
Tazocin	55		≤ 16/2
Ticarcillin	75		≤ 32
Timentin	85		≤ 32/2
Tobramycin	10	4 mm	≤ 4
Trimethoprim	5		≤ 4
Stenotrophomonas maltophilia [o] **(Sensitest, air, 35-37°C)**			
Sulphafurazole [o]	300		≤ 64

[a] The standard 6 mm cut-off applies where no exception has been specified.

[g] For testing urine isolates only

[n] *Burkholderia pseudomallei* is usually susceptible to Augmentin and can be tested against this antibiotic.

[o] See Section 5.12 of the web edition of the CDS manual for notes on testing antibiotic susceptibilities of Sulphafurazole resistant *S. maltophilia.*

Table 1.c. Calibrations: *Anaerobic Organisms*.

Antibiotics, disc potencies, annular radii and MIC for susceptible strains, media and incubation conditions.

Antibiotic	Disc potency (µg)	Exception to the standard interpretation [a]	MIC (mg/L)
Anaerobic organisms[b]			
(Supplemented Brucella Medium Base, anaerobic, 35-37°C)[c]			
Augmentin	3	4 mm	≤ 1/2
Benzylpenicillin	0.5 units		≤ 0.25
Cefoxitin	10		≤ 4
Clindamycin	2	4 mm	≤ 0.5
Meropenem	5		≤ 2
Metronidazole	5	4 mm	≤ 2
Moxifloxacin	2.5	4 mm	≤ 2
Tazocin	55		≤ 8/2
Timentin	85		≤ 32/2

[a] The standard 6 mm cut-off applies where no exception has been specified.
[b] Slow growers should be incubated for 48 hrs.
[c] Brucella Medium Base containing 5% defibrinated horse blood, haemin 5 mg/L and vitamin K 1 mg/L.

Table 1.d. Calibrations: *Yeast*.

Antibiotics, disc potencies, annular radii and MIC for susceptible strains, media and incubation conditions.

Antibiotic	Disc potency (µg)	Exception to the standard interpretation [a]	MIC (mg/L)
Yeasts			
(Supplemented Yeast Nitrogen Base, air, 35-37°C)[b]			
5– Fluorocytosine	1		≤ 1.0
(Casitone complex medium, air, 35-37°C)[c]			
Amphotericin B	10	4 mm	≤ 0.125
Caspofungin [d]	5	2 mm	≤ 1.0
Fluconazole	25	4 mm	≤ 16
Itraconazole	10	2 mm	≤ 2.0
Ketoconazole	10		≤ 2.0
Posaconazole [d]	5	4 mm	≤ 1.0
Voriconazole	1		≤ 1.0

[a] The standard 6 mm cut-off applies where no exception has been specified.
[b] Supplemented Yeast Nitrogen Base.
[c] Supplemented Casitone complex medium.
[d] Commercial discs are not currently available.

2. Surrogate Discs

Table 2.a. Surrogate disc testing: *Gram Positive Organisms*

Antibiotics that can be reported based on susceptibility results obtained with a surrogate disc.

Antibiotic reported	Surrogate disc used	Disc potency (µg)
***Corynebacterium* species**		
Amoxycillin/Ampicillin/Penicillin V	Benzylpenicillin	0.5 units
Azithromycin/Clarithromycin/Roxithromycin	Erythromycin	5
Ceftiofur[a]/other Cephalosporins[b]	Benzylpenicillin	0.5 units
Enrofloxacin[a]/Marbofloxacin[a]/Orbifloxacin[a]	Moxifloxacin	2.5
Lincomycin	Clindamycin	2
Norfloxacin[c]	Ciprofloxacin	2.5
Tetracyclines	Tetracycline	10
Tylosin[a]	Erythromycin	5
Enterococci		
Amoxycillin/Benzylpenicillin	Ampicillin	5
***Listeria* species**		
Amoxycillin/Benzylpenicillin	Ampicillin	5
Staphylococci (except *S. saprophyticus* from urine)		
Amoxycillin/Ampicillin/Penicillin V	Benzylpenicillin	0.5 units
Augmentin	Oxacillin[d]/Cefoxitin[e]	5
Azithromycin/Clarithromycin/Roxithromycin	Erythromycin	5
Ceftiofur[a]/other Cephalosporins[b]	Oxacillin[d]/Cefoxitin[e]	5
Cloxacillin/ Dicloxacillin/ Flucloxacillin	Oxacillin[d]/Cefoxitin[e]	5
Co-trimoxazole[f]	Sulphafurazole	300
Co-trimoxazole[f]	Trimethoprim	5
Enrofloxacin[a]/Marbofloxacin[a]/Orbifloxacin[a]	Moxifloxacin	2.5
Lincomycin	Clindamycin	2
Norfloxacin[c]	Ciprofloxacin	2.5
Sulphonamides	Sulphafurazole	300
Tetracyclines	Tetracycline	10
Tylosin[a]	Erythromycin	5
***Staphylococcus saprophyticus* from urine**		
Amoxycillin/Benzylpenicillin/Penicillin V	Ampicillin	5
Augmentin	Cephalexin	100
Ceftiofur[a]/other Cephalosporins[b]	Cephalexin	100
Cloxacillin/Dicloxacillin/Flucloxacillin	Cephalexin	100
Co-trimoxazole[f]	Sulphafurazole	300
Co-trimoxazole[f]	Trimethoprim	5
Enrofloxacin[a]/Marbofloxacin[a]/Orbifloxacin[a]	Moxifloxacin	2.5
Norfloxacin[c]	Ciprofloxacin	2.5
Sulphonamides	Sulphafurazole	300
Tetracyclines	Tetracycline	10

[a] Antibiotic used in veterinary medicine only.
[b] Ceftazidime is inactive against Gram-positive organisms.
[c] Reporting of norfloxacin is for urine isolates ONLY.
[d] For testing coagulase-negative staphylococci (except *Staphylococcus saprophyticus*) ONLY.
[e] For testing *Staphylococcus aureus* ONLY.
[f] Resistance to co-trimoxazole is indicated only by resistance to both sulphafurazole and trimethoprim.

Table 2.a. Surrogate disc testing: *Gram Positive Organisms* cont.

Antibiotics that can be reported based on susceptibility results obtained with a surrogate disc.

Antibiotic reported	Surrogate disc used	Disc potency (µg)
Streptococci[g]		
Amoxycillin/Ampicillin/Penicillin V	Benzylpenicillin	0.5 units
Amoxycillin/Benzylpenicillin	Ampicillin[h]	5
Azithromycin/Clarithromycin/Roxithromycin	Erythromycin	5
Ceftiofur[a]	Benzylpenicillin	0.5 units
Cephalosporins (*except ceftiofur*)[a]	Cefotaxime/Ceftriaxone	0.5
Lincomycin	Clindamycin	2
Marbofloxacin[a]	Moxifloxacin	2.5
Tetracyclines	Tetracycline	10
Tylosin[a]	Erythromycin	5

[a] Antibiotic used in veterinary medicine only.

[g] For streptococci groups A, B, C, G and *Streptococcus anginosus*, the susceptibility to benzylpenicillin, ampicillin, amoxycillin and cephalosporin antibiotics (except ceftazidime) is extrapolated from the testing of benzylpenicillin 0.5 units.

[h] NOT for testing *Streptococcus pneumoniae* from CSF. Test if isolate is resistant to benzylpenicillin 0.5 units, cefotaxime 0.5 mg or ceftriaxone 0.5 mg.

Table 2.b. Surrogate disc testing: *Gram Negative Organisms*

Antibiotics that can be reported based on susceptibility results obtained with a surrogate disc.

Antibiotic reported	Surrogate disc used	Disc potency (µg)
Acinetobacter, Enterobacteriaceae & *Vibrionaceae* species		
Amoxycillin	Ampicillin	25
Ceftiofur[a]	Cefazolin	30
Cephalothin[b]	Ampicillin	25
Ceftriaxone	Cefotaxime	5
Cefotaxime	Ceftriaxone	5
Co-trimoxazole[c]	Sulphafurazole	300
Co-trimoxazole[c]	Trimethoprim	5
Enrofloxacin[a]/Marbofloxacin[a]/Orbifloxacin[a]	Moxifloxacin	2.5
Piperacillin	Ampicillin	25
Sulphonamides	Sulphafurazole	300
Tetracyclines	Tetracycline	10
Ticarcillin	Ampicillin	25
Branhamella catarrhalis (Moraxella catarrhalis)		
Azithromycin/Clarithromycin/Roxithromycin	Erythromycin	5
Amoxycillin/Ampicillin/Penicillin V	Benzylpenicillin	0.5 units
Augmentin	Cefuroxime/Cefaclor	30
Ceftiofur[a]	Cefuroxime/Cefaclor	30
Cephalosporins	Cefuroxime/Cefaclor	30
Enrofloxacin[a]/Marbofloxacin[a]/Orbifloxacin[a]	Moxifloxacin	2.5
Tetracyclines	Tetracycline	10
***Campylobacter* species**		
Enrofloxacin[a]/Marbofloxacin[a]/Orbifloxacin[a]	Moxifloxacin	2.5
Tetracyclines	Tetracycline	10
***Haemophilus influenzae/Haemophilus* species**		
Amoxycillin	Ampicillin	5
Cefepime	Cefotaxime/Ceftriaxone	0.5
Cefotaxime	Ceftriaxone	0.5
Cefpirome	Cefotaxime/Ceftriaxone	0.5
Ceftazidime	Cefotaxime/Ceftriaxone	0.5
Ceftiofur[a]	Cefuroxime/Cefaclor	30
Ceftriaxone	Cefotaxime	0.5
Cephalexin	Cefuroxime/Cefaclor	30
Enrofloxacin[a]/Marbofloxacin[a]/Orbifloxacin[a]	Moxifloxacin	2.5
Tetracyclines	Tetracycline	10
Helicobacter pylori		
Clarithromycin	Erythromycin	5
Rifabutin	Rifampicin	5

[a] Antibiotic used in veterinary medicine only.
[b] Not for Acinetobacter species.
[c] Resistance to co-trimoxazole is indicated by resistance to both sulphafurazole and trimethoprim.

Table 2.b. Surrogate disc testing: *Gram Negative Organisms* cont.

Antibiotics that can be reported based on susceptibility results obtained with a surrogate disc.

Antibiotic reported	Surrogate disc used	Disc potency (µg)
Neisseria meningitidis		
Ampicillin/Amoxycillin	Benzylpenicillin	0.5 units
Cefotaxime	Ceftriaxone	0.5
Ceftiofur[a]	Benzylpenicillin	0.5 units
Ceftriaxone	Cefotaxime	0.5
Enrofloxacin[a]/Marbofloxacin[a]/Orbifloxacin[a]	Moxifloxacin	2.5
***Pasteurella* species**		
Amoxycillin/Benzylpenicillin	Ampicillin	5
Ampicillin/amoxycillin	Benzylpenicillin[d]	0.5 units
Ceftiofur[a]	Ampicillin	5
Enrofloxacin[a]/Marbofloxacin[a]/Orbifloxacin[a]	Moxifloxacin	2.5
Tetracyclines	Tetracycline	10
***Pseudomonas* species, *Burkholderia* species & *Chryseobacterium* species**		
Azlocillin	Piperacillin	50
Colistin	Polymyxin B	300 units
Co-trimoxazole[c]	Trimethoprim	5
Co-trimoxazole[c]	Sulphafurazole	300
Enrofloxacin[a]/Marbofloxacin[a]/Orbifloxacin[a]	Moxifloxacin	2.5
Norfloxacin[c]	Ciprofloxacin	2.5
Stenotrophomonas maltophilia		
Co-trimoxazole	Sulphafurazole	300

[a] Antibiotic used in veterinary medicine only.
[c] Resistance to co-trimoxazole is indicated by resistance to both sulphafurazole and trimethoprim.
[d] *Pasteurella multocida* is tested against ampicillin 5 µg and NOT benzylpenicillin 0.5 units.

3. Quality Assurance

Table 3.a. Reference strains: *Gram Positive Organisms*

Antibiotics, disc potencies and acceptable zones of inhibition for reference strains.[a]

Antibiotic reported	Disc potency (µg)	Annular radii (mm)[b]
***Enterococcus faecalis* ACM 5184 (Blood Sensitest, CO_2 35°C)**		
Ampicillin	5	5.9 – 9.2
Chloramphenicol	30	6.3 – 8.7
Gentamicin	200	6.6 – 9.9
Linezolid	10	6.6 – 9.0
Nitrofurantoin	200	6.1 – 8.7
Streptomycin	300	5.4 – 7.9
Tigecycline	15	6.6 – 9.5
Teicoplanin	15	3.1 – 5.3
Vancomycin	5	2.0 – 3.7
***Staphylococcus aureus* ACM 5190 (Sensitest, air 35°C)**		
Amoxycillin[c]	2	9.1 – 11.9
Ampicillin	5	12.1 – 18.1
Benzylpenicillin	0.5 units	8.7 – 13.5
Cefoxitin	10	7.1 – 10.1
Cephalexin	100	10.7 – 15.5
Chloramphenicol	30	7.8 – 11.4
Ciprofloxacin	2.5	9.2 – 12.4
Clindamycin	2	8.5 – 12.9
Co-trimoxazole	25	10.1 – 13.3
Erythromycin	5	8.0 – 10.8
Fusidic acid	2.5	8.6 – 12.6
Gatifloxacin	2.5	10.1 – 14.9
Gentamicin	10	6.6 – 9.4
Kanamycin	50	7.8 – 9.6
Linezolid	10	7.9 – 13.1
Moxifloxacin	2.5	10.9 – 14.5
Mupirocin	5	7.4 – 12.2
Neomycin[d]	30	8.1 – 12.9
Nitrofurantoin	200	6.7 – 10.3
Novobiocin[d]	5	6.1 – 12.5
Oxacillin	1	7.4 – 10.4
Pristinamycin	15	9.3 – 12.1
Quinupristin/Dalfopristin	15	9.2 – 12.4
Rifampicin	1	9.3 – 12.5
Sulphafurazole	300	9.3 – 13.7
Teicoplanin	15	3.4 – 6.1
Tetracycline	10	11.3 – 14.4
Tigecycline	15	10.3 – 13.2
Trimethoprim	5	8.5 – 11.3
Vancomycin	5	2.8 – 4.9

[a] Reference strain testing must be performed: (i) In conjunction with the clinical isolate, or at least once weekly; (ii) When a new batch of medium is used; (iii) When a new batch of discs is used.

[b] The acceptable range (95% confidence limits) is the mean ± 2 standard deviations. The mean was derived from > 120 measurements with different operators using different batches of both agar and discs. It is statistically acceptable to use one hundred measurements to represent the "normal distribution" and this gives a confidence limit of 95%, meaning an in-built MU of 5% for the test.

[c] The 2 µg amoxycillin disc is for the susceptibility testing of *H. pylori* only.

[d] Antibiotic used in veterinary medicine only.

Table 3.a. Reference strains: *Gram Positive Organisms* cont.

Antibiotics, disc potencies and acceptable zones of inhibition for reference strains.[a]

Antibiotic reported	Disc potency (µg)	Annular radii (mm)[b]
***Streptococcus pneumoniae* ACM 5191 (Blood Sensitest, 5% CO_2, 35–37˚C)**		
Ampicillin	5	10.8 – 15.2
Benzylpenicillin	0.5 units	8.3 – 14.8
Cefotaxime	0.5	9.3 – 14.8
Cefotaxime	5	10.9 – 15.3
Ceftriaxone	0.5	9.1 – 14.3
Ceftriaxone	5	11.5 – 15.2
Chloramphenicol	30	8.0 – 13.2
Clindamycin	2	7.1 – 9.9
Co-trimoxazole	25	7.0 – 9.2
Erythromycin	5	7.1 – 12.9
Gatifloxacin	2.5	5.6 – 8.4
Moxifloxacin	2.5	5.6 – 8.6
Pristinamycin	15	8.0 – 10.8
Quinupristin/Dalfopristin	15	6.4 – 9.2
Rifampicin	1	7.5 – 10.8
Teicoplanin	15	5.1 – 8.0
Tetracycline	10	9.5 – 11.5
Tigecycline	15	9.7 – 12.6
Vancomycin	5	5.1 – 8.6

[a] Reference strain testing must be performed: (i) In conjunction with the clinical isolate, or at least once weekly; (ii) When a new batch of medium is used; (iii) When a new batch of discs is used.

[b] The acceptable range (95% confidence limits) is the mean ± 2 standard deviations. The mean was derived from > 120 measurements with different operators using different batches of both agar and discs. It is statistically acceptable to use one hundred measurements to represent the "normal distribution" and this gives a confidence limit of 95%, meaning an in-built MU of 5% for the test.

Table 3.b. Reference strains: *Gram Negative Organisms*

Antibiotics, disc potencies and acceptable zones of inhibition for reference strains.[a]

Antibiotic reported	Disc potency (µg)	Annular radii (mm)[b]
***Bacteroides fragilis* ACM 5196[c] (Blood Sensitest, anaerobic, 35-37°C)**		
Metronidazole	5	7.1 – 13.5
***Campylobacter jejuni* ACM 5183 (Blood Sensitest, microaerophilic, 42°C)**		
Ciprofloxacin	2.5	9.2 – 16.9
Erythromycin	5	6.4 – 12.4
Gentamicin	10	7.0 – 11.0
Tetracycline	10	14.5 – 18.6

[a] Reference strain testing must be performed: (i) In conjunction with the clinical isolate, or at least once weekly; (ii) When a new batch of medium is used; (iii) When a new batch of discs is used.

[b] The acceptable range (95% confidence limits) is the mean ± 2 standard deviations. The mean was derived from > 120 measurements with different operators using different batches of both agar and discs. It is statistically acceptable to use one hundred measurements to represent the "normal distribution" and this gives a confidence limit of 95%, meaning an in-built MU of 5% for the test.

[c] *Bacteroides fragilis* (ACM 5196) may be used as the reference strain when testing *H. pylori* against metronidazole. When testing anaerobic organisms, *Clostridium perfringens* (ACM 5240) should be used as the reference organism.

Table 3.b. Reference strains: *Gram Negative Organisms* cont.

Antibiotics, disc potencies and acceptable zones of inhibition for reference strains.[a]

Antibiotic reported	Disc potency (µg)	Annular radii (mm)[b]
***Escherichia coli* ACM 5185** [d] **(Sensitest, air, 35–37°C)**		
Amikacin	30	6.7 – 10.3
Ampicillin	25	7.5 – 10.7
Apramicin[d]	15	5.3 – 7.9
Aztreonam	30	13.7 – 15.9
Cefazolin	30	6.7 – 12.7
Cefepime	10	11.9 – 15.3
Cefotaxime	5	9.7 – 13.7
Cefotetan	30	11.9 – 14.8
Cefoxitin	30	9.8 – 13.0
Cefpirome	10	11.9 – 14.6
Cefpodoxime	10	10.3 – 12.7
Ceftazidime	10	9.3 – 14.1
Ceftriaxone	5	10.5 – 14.3
Cefuroxime	30	8.3 – 11.1
Cephalexin	100	6.9 – 10.9
Chloramphenicol	30	8.7 – 11.9
Ciprofloxacin	2.5	12.4 – 15.8
Gatifloxacin	2.5	11.2 – 14.8
Enoxacin	10	9.7 – 15.7
Ertapenem	10	12.1 – 16.1
Gentamicin	10	6.2 – 9.4
Imipenem	10	10.3 – 13.5
Kanamycin	50	6.2 – 11.8
Meropenem	5	11.0 – 14.4
Moxifloxacin	2.5	10.0 – 13.4
Nalidixic acid	30	8.9 – 12.1
Neomycin[e]	30	6.0 – 8.6
Nitrofurantoin	200	6.3 – 9.5
Norfloxacin	10	10.4 – 16.4
Polymyxin B	300 units	5.1 – 7.5
Spectinomycin[d]	25	5.0 – 7.8
Streptomycin[e]	25	6.2 – 7.8
Sulphafurazole	300	6.7 – 10.7
Tetracycline	10	4.5 – 8.6
Tigecycline	15	9.7 – 12.6
Tobramycin	10	6.4 – 8.4
Trimethoprim	5	8.8 – 13.6
***Escherichia coli* ACM 5186 (Sensitest, air, 35-37°C)**		
Augmentin	60	6.4 – 9.6
Timentin	85	6.0 – 8.4
Tazocin	55	7.4 – 9.2

[a] Reference strain testing must be performed: (i) In conjunction with the clinical isolate, or at least once weekly; (ii) When a new batch of medium is used; (iii) When a new batch of discs is used.

[b] The acceptable range (95% confidence limits) is the mean ± 2 standard deviations. The mean was derived from > 120 measurements with different operators using different batches of both agar and discs. It is statistically acceptable to use one hundred measurements to represent the "normal distribution" and this gives a confidence limit of 95%, meaning an in-built MU of 5% for the test.

[d] If antibiotic discs are tested with *Escherichia coli* ACM 5185, there is no need to test these against *Pseudomonas aeruginosa* ACM 5189 as well and vice versa.

[e] Antibiotic used in veterinary medicine only

Table 3.b. Reference strains: *Gram Negative Organisms* cont.

Antibiotics, disc potencies and acceptable zones of inhibition for reference strains.[a]

Antibiotic reported	Disc potency (µg)	Annular radii (mm)[b]
***Haemophilus influenzae* ACM 5187 (HTM[f] agar, 5% CO_2, 35-37°C)**		
Ampicillin	5	7.0 – 11.1
Cefaclor	30	8.1 – 12.1
Cefotaxime	0.5	9.2 – 12.8
Cefpodoxime	10	10.9 – 14.1
Ceftriaxone	0.5	9.1 – 12.9
Cefuroxime	30	8.3 – 12.8
Chloramphenicol	10	11.1 – 14.3
Ciprofloxacin	2.5	11.1 – 15.9
Co-trimoxazole	25	9.0 – 12.5
Gatifloxacin	2.5	13.5 – 17.1
Moxifloxacin	2.5	10.6 – 15.2
Tetracycline	10	9.0 – 13.9
***Haemophilus influenzae* ACM 5188 (HTM[f] agar, 5% CO_2, 35-37°C)**		
Augmentin	15	7.7 – 10.1
***Neisseria gonorrhoeae* ACM 5239 (WHO C) (Chocolate Columbia Blood Agar, 5% CO_2, 35-37°C, humidity > 80%)**		
Benzylpenicillin	0. 5 units	2.1 – 4.1
Ceftriaxone	0.5	8.2 – 11.0
Ciprofloxacin	1	12.7 – 16.3
Nalidixic acid	30	11.3 – 14.5
Spectinomycin	100	6.9 – 8.9
***Pseudomonas aeruginosa* ACM 5189** [d] **(Sensitest, air, 35-37°C)**		
Amikacin	30	7.4 – 10.6
Aztreonam	30	8.3 – 13.1
Cefepime	10	8.1 – 11.3
Cefpirome	10	8.1 – 10.6
Ceftazidime	10	7.5 – 11.9
Ciprofloxacin	2.5	8.9 – 14.5
Ertapenem[g]	10	–[g]
Gatifloxacin	2.5	7.8 – 11.4
Gentamicin	10	5.5 – 9.5
Imipenem	10	7.9 – 10.3
Meropenem	5	9.7 – 14.8
Moxifloxacin[g]	2.5	–[g]
Piperacillin	50	8.1 – 12.9
Polymyxin B	300 units	5.2 – 7.2
Ticarcillin	75	7.3 – 12.1
Tobramycin	10	7.0 – 10.6

[a] Reference strain testing must be performed: (i) In conjunction with the clinical isolate, or at least once weekly; (ii) When a new batch of medium is used; (iii) When a new batch of discs is used.

[b] The acceptable range (95% confidence limits) is the mean ± 2 standard deviations. The mean was derived from > 120 measurements with different operators using different batches of both agar and discs. It is statistically acceptable to use one hundred measurements to represent the "normal distribution" and this gives a confidence limit of 95%, meaning an in-built MU of 5% for the test.

[d] If antibiotic discs are tested with *Escherichia coli* ACM 5185, there is no need to test these against *Pseudomonas aeruginosa* ACM 5189 as well and vice versa.

[f] Haemophilus Test Medium Base containing 15 mg/L freshly prepared Haematin and NAD.

[g] Ertapenem and Moxifloxacin should be tested against *E. coli* ACM 5185.

Table 3.c. Reference strains: *Anaerobic Organisms*

Antibiotics, disc potencies and acceptable zones of inhibition for reference strains.[a]

Antibiotic reported	Disc potency (µg)	Annular radii (mm)[b]
***Clostridium perfringens* ACM 5240**		
(Supplemented Brucella Medium Base, anaerobic, 35-37°C)[c]		
Benzylpenicillin	0. 5 units	6.3 – 7.9
Cefoxitin	10	7.3 – 9.7
Clindamycin	2	6.1 – 8.1
Meropenem	5	10.1 – 12.9
Metronidazole	5	4.3 – 6.7
Moxifloxacin	2.5	4.7 – 6.3
***Bacteroides fragilis* ACM 5196**		
(Supplemented Brucella medium Base, anaerobic, 35-37°C)[c]		
Augmentin	3	5.1 – 8.3
Tazocin	55	9.0 – 12.2
Timentin	85	11.6 – 16.0

[a] Reference strain testing must be performed: (i) In conjunction with the clinical isolate, or at least once weekly; (ii) When a new batch of medium is used; (iii) When a new batch of discs is used.

[b] The acceptable range (95% confidence limits) is the mean ± 2 standard deviations. The mean was derived from > 120 measurements with different operators using different batches of both agar and discs. It is statistically acceptable to use one hundred measurements to represent the "normal distribution" and this gives a confidence limit of 95%, meaning an in-built MU of 5% for the test.

[c] Brucella Medium Base containing 5% defibrinated horse blood, haemin 5 mg/L and vitamin K 1 mg/L.

Table 3.d. Reference strains: *Yeast*

Antibiotics, disc potencies and acceptable zones of inhibition for reference strains.[a]

Antibiotic reported	Disc potency (µg)	Annular radii (mm)[b]
***Candida albicans* ACM 5238**		
(Supplemented Yeast Nitrogen Base, aerobic, 35-37°C)[c]		
5–Fluorocytosine	1	9.0 – 12.7
***Candida albicans* ACM 5238**		
(Casitone Complex medium, aerobic, 35-37°C)[d]		
Amphotericin B	10	5.4 – 6.7
Caspofungin	5	[e]
Fluconazole	25	7.4 – 10.0
Itraconazole	10	5.1 – 7.5
Ketoconazole	10	8.6 – 12.4
Posaconazole	5	[e]
Voriconazole	1	9.0 – 11.3

[a] Reference strain testing must be performed: (i) In conjunction with the clinical isolate, or at least once weekly; (ii) When a new batch of medium is used; (iii) When a new batch of discs is used.

[b] The acceptable range (95% confidence limits) is the mean ± 2 standard deviations. The mean was derived from > 120 measurements with different operators using different batches of both agar and discs. It is statistically acceptable to use one hundred measurements to represent the "normal distribution" and this gives a confidence limit of 95%, meaning an in-built MU of 5% for the test.

[c] Yeast Nitrogen Base supplemented with L-asparagine, glucose and Agar Technical No 3.

[d] Casitone complex medium contains Bacto Casitone supplemented with yeast extract, sodium citrate, di-sodium hydrogen phosphate, potassium di-hydrogen phosphate, glucose and Agar Technical No 3.

[e] Commercial discs are not currently available.

4. Testing and reporting β-lactam antibiotics

Table 4.a. A guide to the testing and reporting of β-lactam antibiotics for Gram-negative organisms.

Organism [a]	Antibiotic [b,c] AMP	AMC	ATM	CAZ	CXM,CL,CPD CRO,CTX,KZ	CPO FEP	CTT	FOX	IPM,MEM ETP	PRL	TIM	TZP
Enterobacteriaceae with an inducible AmpC [d]	R	R	R	R	R	**T**	R	R	**T**	R	R	R
Aeromonas /A2 (most *A. sobria*)[e]	R	R	**T**	**T**	**T**	**T**	**T**	**T**	R[e]	R	R	R
Aeromonas /A1 & A2	R	R	**T**	R	R	**T**	R	R	R	R	R	R
Providencia stuartii /rettgeri Morganella. morganii	R	R	**T**	R	R	**T**	R	R	**T**	R	R	**T**
Proteus vulgaris / penneri[f]	R	**U**	R	**T**	R[f]	R	**T**	**T**	**T**	R	**U**	**U**
K. oxytoca K1 hyperproducer[g]	R	**U**	R	**T**[g]	R[g]	**R**	**T**	**T**	**T**	R	**U**	**U**
Enterobacteriaceae with an AmpC	R	R	R	R	R	**T**	R	R	**T**	R	R	R
Enterobacteriaceae with ESBL	R	**U**	R	R	R	R	**T**	R	**T**	R	**U**	**U**
Pseudomonas[h]*/Burkholderia species*	R	R[h]	**T**	**T**	R	**T**	R	R	**T**	**T**	**T**	**T**
P. aeruginosa with ESBL	R	R	R	R	R	R	R	R	**T**	R	**U**	**U**
Organism with metallo-β-lactamase	R	R	**T**	R	R	R	R	R	R	R	R	R
Stenotrophomonas maltophilia[i]	R	R	R[i]	R[i]	R	R	R	R	R	R[i]	R[i]	R[i]

[a] Where an organism fits into more than one category resistance (R) to an antibiotic in any one category takes precedence over the remaining categories.

[b] R = The organism is resistant to the antibiotic because it possesses a mechanism of resistance that may not be demonstrated by disc testing.
T = Can be tested.
U = Test isolates from urine ONLY. Isolates from other sites are considered RESISTANT.

[c]

AMP	ampicillin	CL	cephalexin	CTX	cefotaxime	KZ	cefazolin
AMC	augmentin	CPD	cefpodoxime	ETP	ertapenem	MEM	meropenem
ATM	aztreonam	CPO	cefpirome	FEP	cefepime	PRL	piperacillin
CAZ	ceftazidime	CRO	ceftriaxone	FOX	cefoxitin	TIM	Timentin
CXM	cefuroxime	CTT	cefotetan	IPM	imipenem	TZP	Tazocin

[d] *Enterobacter aerogenes, Enterobacter cloacae, Serratia marcescens, Citrobacter freundii, Hafnia alvei.*

[e] *A. caviae* does not possess a carbapenemase (A 2) and can be tested against imipenem, meropenem and ertapenem.

[f] Isolates with high β-lactamase activity may give no zone around CTX 5 µg but show a "key-hole" effect that may be mistaken as an indication of the presence of an ESBL. However, unlike ESBL producers, they may be susceptible to ceftazidime.

[g] *K. oxytoca* hyperproducer of the K1 enzyme may have a reduced zone of inhibition around a cefotaxime/ceftriaxone disc. However, the organism is usually susceptible to ceftazidime and can be tested.

[h] *B. pseudomallei* is usually susceptible to Augmentin and can be tested against this antibiotic.

[i] See Section 5.12 of the web edition of the CDS manual for notes on testing *S. maltophilia* against these and other antibiotics.

Additions and modifications since the fourth printed edition of the CDS manual.

The following additions and modifications have been made since the fourth printed edition of the CDS manual; please check our website periodically for recent additions, corrections or changes to the method.

1.	November 2006	Some sections of the manual have been rewritten for improved clarity, without changing the actual information content.
2.	November 2006	Section 3.1.2. on the 'Handling and storage of reference strains' has been expanded to clarify the preferred method for the storing, maintaining and recovering of reference organisms as well an accetable alternative for laboratories lacking cryogenic storage facilities.
3.	November 2006	Tables reformatted for consistency with the formatting used on the web site.
4.	November 2006	Table 5a (*Neisseria gonorrhoeae* calibrations) is now incorporated into Table 10.1.b (Gram-negative calibrations)
5.	November 2006	Table 5b (*Neisseria gonorrhoeae* reference strain quality control) is now incorporated into Table 10.3.a (Gram-negative reference strain quality control)
6.	November 2006	Table 6a (Anaerobe calibrations) is now incorporated into Table 10.1 as Table 10.1.c.
7.	November 2006	Table 6b (Anaerobe reference strain quality control) is now incorporated into Table 10.3 as Table 10.3.c.
8.	November 2006	Table 7a (Yeast calibrations) is now incorporated into Table 10.1 as Table 10.1.d.
9.	November 2006	Table 7b (Anaerobe reference strain quality control) is now incorporated into Table 10.3 as Table 10.3.d.
10.	November 2006	Tables, Figures and Plates are now numbered within in each chapter and preceded by the chapter number.
11.	November 2006	Photographic plates have been rearranged to make it easier to find examples relating to particular organisms.
12.	December 2006	References are now included at the end of each chapter.
13.	January 2007	Wire manufacturers have now switched from SWG (Standard Wire Gauge) gauges to B&S (Brown and Sharp) gauges. Accordingly, it was necessary to switch from the previously specified 0.56 mm SWG (SWG 24) gauge to 0.574 mm B&S gauge (B&S 23 nichrome wire). This has been evaluated and no significant difference in inoculum strength or zone size was detected. Note: Don't confuse SWG with AWG – AWG (American Wire Gauge) is equivalent to B&S.

14.	January 2007	The previously listed nichrome wire supplier has closed down. New suppliers are now listed in Section 2.1 of this manual.
15.	January 2007	We now recommend that Moxifloxacin (and not Ciprofloxacin) be used as the surrogate for Enrofloxacin and Orbifloxacin (See Newsletter 21).
16.	February 2007	Tigecycline calibrations have been added to Tables 10.1.a and 10.1.b
17.	March 2007	The protocol for detecting and confirming metallo-β-lactamase (MBL) expression has been modified and extended to assist in detecting co-expression of an MBL and an ESBL (Sections 5.1, 5.5.6 and 5.10 and Appendix A1.2 of the web edition of CDS manual).
18.	May 2007	Streptomycin calibrations have been added to Tables 10.1.a and 10.3.a for enterococci.
19.	May 2007	Recalibration of gentamicin for enterococci (Table 10.1.a)
20.	May 2007	Co-trimoxazole calibrations have been added to Tables 10.1.a for *Listeria*.
21.	May 2007	Voriconazole calibrations have added to table 10.1.d Yeast
22.	June 2007	Inserted into Table 10.2.b (Surrogate disc testing): Ciprofloxacin 2.5 μg can used as a surrogate disc for reporting the susceptibility of *Pseudomonas* to norfloxacin.
23.	June 2007	Inserted Enterobacteriaceae calibrations for Polymyxin B into 10.1.b
24.	June 2007	Inserted the acceptable range for Polymyxin B when tested against reference strain *Escherichia coli* ACM 5185 into Table 10.3.b.
25.	February 2008	β-lactamases of *Stenotrophomonas maltophilia* now mentioned in section 5.12
26.	May 2008	We now recommend that *Proteus vulgaris* or *Proteus penneri*, which possess a Bush group 2e β-lactamase, be reported as resistant to both Cefpirome and Cefepime.
27.	May 2008	We now recommend that *Klebsiella* oxytoca K1 hyperproducers be reported as resistant to both Cefpirome (CPO) and Cefepime (FEP). Augmentin (AMC), Timentin (TIM) and Tazocin (TZP) should only be tested against urinary isolates of this organism; from all other sites report it as resistant to these antibiotics.
28.	May 2008	Caspofungin and Posaconazole calibrations have been added to Table 10.1.d Yeast.
29.	May 2008	Following recalibration we now recommend using Tetracycline 10 μg for all susceptibility and quality assurance testing. The quality assurance 95% confidence intervals for the 10 μg discs are listed in table 10.3 of the web edition of the CDS manual and in Table 3 of this handout.

30. June 2008	The procedure for the handling and storage of reference strains extended to cover *Neisseria gonorrhoeae*.

Corrigenda for the CDS manual

The corrections in the table below apply to the 4th printed edition of the CDS manual; please check our website periodically for recent additions, corrections or changes.

4th printed edition ONLY				
#	**Correction Date**	**Type**	**Location**	**Correction**
1.	September 2006	Insertion	Page 58, Table 4 Row = *Proteus vulgaris* / *penneri* Column = AMC	Content = **T**[4]
2.	September 2006	Insertion	Page 58, Table 4 Row = *Proteus vulgaris* / *penneri* Column = TIM	Content = **T**[4]
3.	September 2006	Insertion	Page 58, Table 4 Row = *Proteus vulgaris* / *penneri* Column = TZP	Content = **T**[4]
4.	September 2006	Row insertion	Page 53, Table 3a. Under *Staph. aureus*. Between Moxifloxacin and Nitrofurantoin	Mupirocin 5 µg 7.4 - 12.2
5.	September 2006	Replace text	Page 61, Table 6b Row = *Clostridium perfringens* ACM 5198 Column = Antibiotic	Old text = 5198 New text = 5240
6.	September 2006	Replace text	Page 61, Table 6b Under *Clostridium perfringens* Row = Cefoxitin Column = Disc Potency	Old text = 30 New text = 10

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#	Correction Date	Type	Location	Correction
7.	September 2006	Replace text	Page 55, Table 3b Row = Sulphafurazole 300 Column = Acceptable Range	Old text = 5.0 – 9.4 New text = 6.7 – 10.7
8.	September 2006	Insertion	Page 76 3rd numbered heading 1.2.1.7	**11.2.1.7**
9.	September 2006	Insertion	Page 79 1st numbered heading 1.2.3.2	**11.2.3.2**
10.	October 2006	Insertion	Page 1 Telephone number.	Old text = 9382 9053 New text = 9382 9046/9053
11.	January 2007	Deletion	Tables 2a and 2b. Pages 49 to 52	We now recommend that Moxifloxacin (and not Ciprofloxacin) be used as the surrogate for Enrofloxacin and Orbifloxacin. See Additions and modifications, item 15, January 2007. Delete all rows for Enrofloxacin#/Orbifloxacin#. See item 12, below
12.	January 2007	Replace text	Tables 2a and 2b Pages 49 to 52 Under all organisms except Streptococci (Do not alter the Marbofloxacin row under Streptococci).	We now recommend that Moxifloxacin (and not Ciprofloxacin) be used as the surrogate for Enrofloxacin and Orbifloxacin. See Additions and modifications, item 15, January 2007. Old text Marbofloxacin# New text Enrofloxacin#/Marbofloxacin#/Orbifloxacin#

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#	Correction Date	Type	Location	Correction
13.	December 2007 Following recalibration of gentamicin.	Deletion	Page 19 Section 2.9 Interpretation of results. Exceptions:	Delete gentamicin (200 µg) from the exception list for enterococci.
14.	March 2008	Replace and insert text	Table 5a, Page 60, Under Ciprofloxacin 1/Naladixic acid 30, Column 2.	Old text CIP 1 / NA 30 ≥ 6 / ≥ 6 ≥ 6 / 0 < 6 / 0 New text CIP 1 / NA 30 ≥ 6 / ≥ 6 > 6 / < 6 ≤ 6 / < 6
15.	March 2008	Relace Text	Page 37, Under Ciprofloxacin, Item 2.	Old text a ciprofloxacin 1 µg disc is ≥ 6 mm. New text a ciprofloxacin 1 µg disc is > 6 mm.
16.	March 2008	Relace Text	Page 38, Under Ciprofloxacin, Item 3 at top of page, lines 3 and 4.	Old text nalidixic acid 30 µg disc is 0 mm and that around a ciprofloxacin 1 µg disc is < 6 mm. New text nalidixic acid 30 µg disc is < 6 mm and that around a ciprofloxacin 1 µg disc is ≤ 6 mm.

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#	Correction Date	Type	Location	Correction
17.	May 2008	Replace text	Pages 58 and 59, Table 4. Row = *Proteus vulgaris* / *penneri* Column = CPO/FEP	We now recommend that these organisms be reported as resistant to cefpirome and cefepime. See – Additions and modifications, May 2008. Old Text = **T** New text = **R**
18.	May 2008	Replace text	Pages 58 and 59, Table 4. Row = *K. oxytoca* K1 hyperproducer Column = CPO/FEP	We now recommend that this organism be reported as resistant to cefpirome and cefepime. See – Additions and modifications, May 2008. Old Text = **T** New text = **R**
19.	May 2008	Replace text	Pages 58 and 59, Table 4. Row = *K. oxytoca* K1 hyperproducer 3 Columns = AMC, TIM and TZP	We now recommend that this organism only be tested against these antibiotics for Urinary isolates. From all other sites report it as resistant. See – Additions and modifications, May 2008. Old Text = **T** New text = **U**