جداول میکروارگانیسم های بیماریزای اولویت دار و آنتی بیوتیک های تعیین شده برای آزمایش تعیین حساسیت ضد میکروبی در برنامه مهار مقاومت میکروبی

ویرایش چهارم

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تهیه شده توسط کمیته تخصصی میکروب شناسی

آزمایشگاه مرجع سلامت

وزارت بهداشت، درمان و آموزش پزشکی

۱۳۹۸

Escherichia coli					
Antimicrobial Agent	**Disk Content**	**Zone Diameter Interpretive Criteria (nearest whole mm)**			**Comments**
		S	**I**	**R**	
PENICILLINS					
Ampicillin	10 µg	≥ 17	14–16	≤ 13	Results of ampicillin testing can be used to predict results for amoxicillin.
CEPHEMS					
Cefazolin (PARENTERAL)	30 µg	≥ 23	20–22	≤ 19	Breakpoints when cefazolin is used for therapy of infections other than uncomplicated UTIs due to *E.coli*, *K. pneumoniae* & *P.mirabilis*. Breakpoints are based on a dosage regimen of 2 g **administered** every 8 h.
Cefazolin (PARENTERAL) (urine)	30 µg	≥ 15	-	≤ 14	Breakpoints when cefazolin is used for therapy of uncomplicated UTIs due to *E.coli*, *K pneumoniae* & *P.mirabilis*. Breakpoints are based on a dosage regimen of 1 g **administered** every 12 h.
Cefazolin (ORAL) (surrogate test for oral cephalosporins & uncomplicated UTI) (urine)	30 µg	≥ 15	-	≤ 14	(a) Breakpoints are for cefazolin when cefazolin results are used to predict results for the oral agents cefaclor, cefdinir, cefpodoxime, cefprozil, cefuroxime, cephalexin, and loracarbef when used for therapy of uncomplicated UTIs due to *E. coli, K. pneumoniae,* and *P. mirabilis.* (b) Cefazolin as a surrogate may overcall resistance to cefdinir, cefpodoxime, and cefuroxime. If cefazolin tests resistant, test these drugs individually if needed for therapy.
Cefepime	30 µg	≥ 25	19–24	≤ 18	The breakpoint for susceptible is based on a dosage regimen of 1 g **administered** every 12 h. The Breakpoint for SDD* is based on dosing regimens that result in higher cefepime exposure, either higher doses or more frequent doses or both, up to approved maximum dosing regimens. *SDD: Susceptible-Dose Dependent
Cefotaxime	30 µg	≥ 26	23–25	≤ 22	Breakpoints are based on a dosage regimen of 1 g **administered** every 8 h for cefotaxime.

***Escherichia coli* (continued)**					
Ceftriaxone	30 µg	≥ 23	20–22	≤ 19	Breakpoints are based on a dosage regimen of 1 g **administered** every 24 h for ceftriaxone.
Ceftazidime	30 µg	≥ 21	18–20	≤ 17	Breakpoints are based on a dosage regimen of 1 g **administered** every 8 h.
CARBAPENEMS					
Imipenem or/and Meropenem	10 µg 10 µg	≥ 23 ≥ 23	20–22 20–22	≤ 19 ≤ 19	(a) Imipenem: Breakpoints are based on a dosage regimen of 500 mg **administered** every 6 h or 1 g every 8 h. (b) Meropenem: Breakpoints are based on a dosage regimen of 1 g **administered** every 8 h.
AMINOGLYCOSIDES					
Gentamicin	10 µg	≥ 15	13-14	≤ 12	
Amikacin	30 µg	≥ 17	15–16	≤ 14	
FLUOROQUINOLONES					
Ciprofloxacin	5 µg	**≥ 26**	**22-25**	**≤ 21**	**Breakpoints for ciprofloxacin are based on a dosage regimen of 400 mg IV or 500 mg orally administered every 12 h.**
FOLATE PATHWAY INHIBITORS					
Trimethoprim- sulfamethoxazole	1.25/ 23.75 µg	≥ 16	11–15	≤ 10	
NITROFURANS					
Nitrofurantoin	300 µg	≥ 17	15–16	≤ 14	For testing and reporting urinary tract isolates only.

Klebsiella pneumoniae					
Antimicrobial Agent	**Disk Content**	**Zone Diameter Interpretive Criteria (nearest whole mm)**			**Comments**
		S	**I**	**R**	
CEPHEMS					
Cefazolin (PARENTERAL)	30 µg	≥ 23	20–22	≤ 19	Breakpoints when cefazolin is used for therapy of infections other than uncomplicated UTIs due to *E.coli*, *K pneumoniae* & *P.mirabilis*. Breakpoints are based on a dosage regimen of 2 g **administered** every 8 h.
Cefazolin (PARENTERAL) (urine)	30 µg	≥ 15	-	≤ 14	Breakpoints when cefazolin is used for therapy of uncomplicated UTIs due to *E.coli*, *K pneumoniae* & *P.mirabilis*. Breakpoints are based on a dosage regimen of 1 g **administered** every 12 h.
Cefazolin (ORAL) (surrogate test for oral cephalosporins & uncomplicated UTI) (urine)	30 µg	≥ 15	-	≤ 14	(a) Breakpoints are for cefazolin when cefazolin results are used to predict results for the oral agents cefaclor, cefdinir, cefpodoxime, cefprozil, cefuroxime, cephalexin, and loracarbef when used for therapy of uncomplicated UTIs due to *E. coli, K. pneumoniae,* and *P. mirabilis.* (b) Cefazolin as a surrogate may overcall resistance to cefdinir, cefpodoxime, and cefuroxime. If cefazolin tests resistant, test these drugs individually if needed for therapy.
Cefepime	30 µg	≥ 25	19–24	≤ 18	The Breakpoint for susceptible is based on a dosage regimen of 1 g every 12 h. The Breakpoint for SDD* is based on dosing regimens that result in higher cefepime exposure, either higher doses or more frequent doses or both, up to approved maximum dosing regimens. *SDD: Susceptible-Dose Dependent
Cefotaxime	30 µg	≥ 26	23–25	≤ 22	Breakpoints are based on a dosage regimen of 1 g **administered** every 8 h for cefotaxime.

***Klebsiella pneumonia* (continued)**					
Ceftriaxone	30 µg	≥ 23	20–22	≤ 19	Breakpoints are based on a dosage regimen of 1 g **administered** every 24 h for ceftriaxone.
Ceftazidime	30 µg	≥ 21	18–20	≤ 17	Breakpoints are based on a dosage regimen of 1 g **administered** every 8 h.
CARBAPENEMS					
Imipenem or/and Meropenem	10 µg 10 µg	≥ 23 ≥ 23	20–22 20–22	≤ 19 ≤ 19	(a) Imipenem: Breakpoints are based on a dosage regimen of 500 mg **administered** every 6 h or 1 g every 8 h. (b) Meropenem:Interpretive criteria are based on a dosage regimen of 1 g **administered** every 8 h.
AMINOGLYCOSIDES					
Gentamicin	10 µg	≥ 15	13-14	≤ 12	
Amikacin	30 µg	≥ 17	15–16	≤ 14	
FLUOROQUINOLONES					
Ciprofloxacin	5 µg	**≥ 26**	**22-25**	**≤ 21**	**Breakpoints for ciprofloxacin are based on a dosage regimen of 400 mg IV or 500 mg orally administered every 12 h.**
FOLATE PATHWAY INHIBITORS					
Trimethoprim-sulfamethoxazole	1.25/ 23.75 µg	≥ 16	11–15	≤ 10	
NITROFURANS					
Nitrofurantoin	300 µg	≥ 17	15–16	≤ 14	For testing and reporting urinary tract isolates only.

∗When fecal isolates of *Salmonella* are tested, only ampicillin, a fluoroquinolone, and trimethoprim-sulfamethoxazole should be reported routinely. In addition, for extraintestinal isolates of *Salmonella* spp., a third-generation cephalosporin and chloramphenicol should be tested and reported.

***Salmonella* spp.**					
Antimicrobial Agent	**Disk Content**	**Zone Diameter Interpretive Criteria (nearest whole mm)**			**Comments**
		S	**I**	**R**	
PENICILLINS					
Ampicillin	10 µg	≥ 17	14–16	≤ 13	Results of ampicillin testing can be used to predict results for amoxicillin.
CEPHEMS					
Ceftriaxone (For extraintestinal isolate)	30 µg	≥ 23	20–22	≤ 19	Breakpoints are based on a dosage regimen of 1 g **administered** every 24 h for ceftriaxone
Ceftazidime (For extraintestinal isolate)	30 µg	≥ 21	18–20	≤ 17	Breakpoints are based on a dosage regimen of 1 g **administered** every 8 h.
FLUOROQUINOLONES					
Ciprofloxacin	5 µg	≥ 31	21-30	≤ 20	Isolates of *Salmonella* spp. that test not susceptible to ciprofloxacin, levofloxacin, ofloxacin, or pefloxacin may be associated with clinical failure or delayed response in fluoroquinolone-treated patients with salmonellosis.
FOLATE PATHWAY INHIBITORS					
Trimethoprim-sulfamethoxazole	1.25/ 23.75 µg	≥ 16	11–15	≤ 10	
PHENICOLS					
Chloramphenicol	30 µg	≥ 18	13–17	≤ 12	

∗When fecal isolates of *Shigella* spp. are tested, only ampicillin, a fluoroquinolone, and trimethoprim-sulfamethoxazole should be reported routinely.

***Shigella* spp.**					
Antimicrobial Agent	**Disk Content**	**Zone Diameter Interpretive Criteria (nearest whole mm)**			**Comments**
		S	**I**	**R**	
PENICILLINS					
Ampicillin	10 µg	≥ 17	14–16	≤ 13	Results of ampicillin testing can be used to predict results for amoxicillin.
CEPHEMS					
Ceftriaxone (Only for ciprofloxacin resistant strain)	30 µg	≥ 23	20–22	≤ 19	Breakpoints are based on a dosage regimen of 1 g **administered** every 24 h for ceftriaxone
Ceftazidime (Only for ciprofloxacin resistant strain)	30 µg	≥ 21	18–20	≤ 17	Breakpoints are based on a dosage regimen of 1 g **administered** every 8 h.
FLUOROQUINOLONES					
Ciprofloxacin	5 µg	**≥ 26**	**22-25**	**≤ 21**	**Breakpoints for ciprofloxacin are based on a dosage regimen of 400 mg IV or 500 mg orally administered every 12 h.**
FOLATE PATHWAY INHIBITORS					
Trimethoprim-sulfamethoxazole	1.25/ 23.75 µg	≥ 16	11–15	≤ 10	

Tests for Extended-Spectrum β-Lactamases in *Escherichia coli*, *Klebsiella pneumonia*, *Salmonella* spp and *Shigella* spp.		
Test	**Criteria for Performance of ESBL Test**	**ESBL Test**
Antimicrobial concentration	**Cefpodoxime 10 µg or** **Ceftazidime 30 µg or** **Aztreonam 30 µg or** **Cefotaxime 30 µg or** **Ceftriaxone 30 µg** **(Using more than one antimicrobial agent improves the sensitivity of ESBL detection.)**	**Ceftazidime 30 µg** **Ceftazidime-clavulanatea 30/10 µg** **and** **Cefotaxime 30 µg** **Cefotaxime-clavulanate 30/10 µg** **(Testing necessitates using both cefotaxime and ceftazidime, alone and in combination with clavulanate.)**
Results	**Cefpodoxime zone ≤ 17 mm** **Ceftazidime zone ≤ 22 mm** **Aztreonam zone ≤ 27 mm** **Cefotaxime zone ≤ 27 mm** **Ceftriaxone zone ≤ 25 mm** **Zones above may indicate ESBL production.**	**A ≥ 5mm increase in a zone diameter for either antimicrobial agent tested in combination with clavulanate vs the zone diameter of the agent when tested alone = ESBL (eg, ceftazidime zone = 16; ceftazidime-clavulanate zone = 21).**
Reporting		**For all confirmed ESBL-producing strains:** **If laboratories do not use current cephalosporin and aztreonam breakpoints, the test interpretation should be reported as resistant for all penicillins, cephalosporins, and aztreonam.** **If laboratories use current cephalosporin and aztreonam breakpoints, then test interpretations for these agents do not need to be changed from susceptible to resistant.**

Pseudomonas aeruginosa					
Antimicrobial Agent	**Disk Content**	**Zone Diameter Interpretive Criteria (nearest whole mm)**			**Comments**
		S	**I**	**R**	
β-LACTAM/β-LACTAMASE INHIBITOR COMBINATIONS					
Piperacillin-tazobactam	100/10 µg	≥ 21	15–20	≤ 14	Breakpoints for piperacillin (alone or with tazobactam) are based on a piperacillin dosage regimen of at least 3 g **administtered** every 6 h.
CEPHEMS					
Cefepime	30 µg	≥ 18	15-17	≤ 14	Breakpoints are based on a dosage regimen of 1 g **administtered** every 8 h or 2 g **administtered** every 12 h.
Ceftazidime	30 µg	≥ 18	15-17	≤ 14	Breakpoints are based on a dosage regimen of 1 g **administtered** every 6 h or 2 g **administtered** every 8 h.
CARBAPENEMS					
Imipenem	10 µg	≥ 19	16-18	≤ 15	Breakpoints for imipenem are based on a dosage regimen of 1 g **administtered** every 8 h or 500 mg **administtered** every 6 h.
Meropenem	10 µg	≥ 19	16-18	≤ 15	Breakpoints for meropenem are based on a dosage regimen of 1 g **administtered** every 8 h.
AMINOGLYCOSIDES					
Gentamicin	10 µg	≥ 15	13-14	≤ 12	
Tobramycin	10 µg	≥ 15	13-14	≤ 12	
Amikacin	30 µg	≥ 17	15–16	≤ 14	
LIPOPEPTID					
Colistin	-	-	-	-	(a) Colistin (methanesulfonate) should generally be administered with a loading dose and at the maximum recommended doses, in combination with other agents. (b) The only approved MIC method for testing is broth microdilution. Disk diffusion and gradient diffusion methods such as "E-test" should not be performed. MIC Interpretive Criteria (µg/mL) S: ≤ 2 / I: - / R: ≥ 4

Pseudomonas aeruginosa (continued)					
FLUOROQUINOLONES					
Ciprofloxacin	5 µg	**≥ 25**	**19-24**	**≤ 18**	**Breakpoints are based on a dosage regimen of 400 mg IV administered every 8 h.**

***Acinetobacter* spp.**					
Antimicrobial Agent	**Disk Content**	**Zone Diameter Interpretive Criteria (nearest whole mm)**			**Comments**
		S	**I**	**R**	
β-LACTAM/β-LACTAMASE INHIBITOR COMBINATIONS					
Ampicillin-sulbactam	10/10 µg	≥ 15	12-14	≤ 11	
Piperacillin-tazobactam	100/10 µg	≥ 21	18–20	≤ 17	
CEPHEMS					
Cefepime	30 µg	≥ 18	15-17	≤ 14	
Ceftazidime	30 µg	≥ 18	15-17	≤ 14	
CARBAPENEMS					
Imipenem	10 µg	≥ 22	19-21	≤ 18	Breakpoints are based on a dosage regimen of 500 mg **administered** every 6 h.
Meropenem	10 µg	≥ 18	15-17	≤ 14	Breakpoints are based on a dosage regimen of 1 g **administered** every 8 h or 500 mg **administered** every 6 h.
AMINOGLYCOSIDES					
Gentamicin	10 µg	≥ 15	13-14	≤ 12	
Tobramycin	10 µg	≥ 15	13-14	≤ 12	
Amikacin	30 µg	≥ 17	15–16	≤ 14	
TETRACYCLINES					
Minocycline	30 µg	≥ 16	13–15	≤ 12	
LIPOPEPTID					
Colistin	-	-	-	-	(a) Colistin (methanesulfonate) should generally be administered with a loading dose and at the maximum recommended doses, in combination with other agents. (b) Applies to *A. baumannii* complex only. (c) The only approved MIC method for testing is broth microdilution. Disk diffusion and gradient diffusion methods such as "E-test" should not be performed.
					MIC Interpretive Criteria (µg/mL)
					S: ≤ 2 / I: - / R: ≥ 4

Acinetobacter spp. (continued)					
FLUOROQUINOLONES					
Ciprofloxacin	5 µg	≥ 21	16–20	≤ 15	
FOLATE PATHWAY INHIBITORS					
Trimethoprim-sulfamethoxazole	1.25/ 23.75 µg	≥ 16	11–15	≤ 10	

Staphylococcus aureus					
Antimicrobial Agent	**Disk Content**	**Zone Diameter Interpretive Criteria (nearest whole mm)**			**Comments**
		S	**I**	**R**	
PENICILLINASE-LABILE PENICILLINS					
Penicillin	10 units	≥ 29	-	≤ 28	(a) Penicillin should be used to test the susceptibility of all staphylococci to all penicillinase-labile penicillins. Penicillin-resistant strains of staphylococci produce β-lactamase. Perform test(s) to detect β-lactamase production on staphylococci for which the penicillin MICs are ≤ 0.12 µg/mL or zone diameters ≥ 29 mm before reporting the isolate as penicillin susceptible. Rare isolates of staphylococci that contain genes for β-lactamase production may appear negative by β-lactamase tests. Consequently, for serious infections requiring penicillin therapy, laboratories should perform MIC tests and β-lactamase testing on all subsequent isolates from the same patient. PCR testing of the isolate for the *blaZ* β-lactamase gene may be considered. See Tables 3D and 3E. (b) For oxacillin-resistant staphylococci report penicillin as resistant or do not report.

***Staphylococcus aureus* (continued)**					
PENICILLINASE-STABLE PENICILLINS					
Oxacillin (Oxacillin disk testing is not reliable for *S. aureus* and *S. lugdunensis*.)	30 µg Cefoxitin (surrogate test for oxacillin)	≥ 22 (cefoxitin)	-	≤ 21 (cefoxitin)	(a) Cefoxitin is tested as a surrogate for oxacillin **for some species of *Staphylococcus***. Isolates that test resistant by cefoxitin **or oxacillin, when using the appropriate test method for the species,** should be reported as oxacillin resistant. If testing only cefoxitin, report oxacillin susceptible or resistant based on the cefoxitin result. **Isolates that test either *mecA* negative or PBP2a negative or cefoxitin susceptible should be reported as oxacillin susceptible.** (b) **For isolates of *S.aureus* that do not grow well on** CAMHB* or unsupplemented MHA **(eg, small-colony variants), testing on other media (eg, BMHA) does** not reliably detect *mecA*-mediated resistance. Testing for PBP2a using induced growth (ie, growth taken from the zone margin surrounding a cefoxitin disk on either BMHA or a blood agar plate after 24 hours incubation in 5% CO_2) or *mecA* should be done. ***Cation Adgusted Mueller Hinton Agar**

***Staphylococcus aureus* (continued)**					
GLYCOPEPTIDES					
Vancomycin	-	-	-	-	(a) For *S. aureus,* vancomycin-susceptible isolates may become vancomycin intermediate during the course of prolonged therapy. (b) MIC tests should be performed to determine the susceptibility of all isolates of staphylococci to vancomycin. The disk test does not differentiate vancomycin-susceptible isolates of *S. aureus* from vancomycin-intermediate isolates, nor does the test differentiate among vancomycin susceptible, -intermediate, and -resistant isolates of ***Staphylococcus* spp. other than *S. aureus*** all of which give similar size zones of inhibition. (c) Send any *S. aureus* for which the vancomycin is ≥ 8 µg/mL to a reference laboratory. MIC Interpretive Criteria (µg/mL) S: ≤ 2 | I: 4-8 | R: ≥ 16
Teicoplanin (Optional) (Investigation)	-	-	-	-	MIC Interpretive Criteria (µg/mL) S: ≤ 8 | I: 16 | R: ≥ 32
TETRACYCLINES					
Doxycycline	30 µg	≥ 16	13-15	≤ 12	
MACROLIDES					
Erythromycin	15 µg	≥ 23	14-22	≤ 13	Not routinely reported on organisms isolated from the urinary tract.
FLUOROQUINOLONES					
Ciprofloxacin	5 µg	≥ 21	16–20	≤ 15	*Staphylococcus* spp. may develop resistance during prolonged therapy with quinolones. Therefore, isolates that are initially susceptible may become resistant within three to four days after initiation of therapy. Testing of repeat isolates may be warranted.

Staphylococcus aureus (continued)					
NITROFURANTOINS					
Nitrofurantoin	300 µg	≥ 17	15-16	≤ 14	**For testing and reporting urinary tract isolates only**
FOLATE PATHWAY INHIBITORS					
Trimethoprim-sulfamethoxazole	1.25/ 23.75 µg	≥ 16	11-15	≤ 10	
LINCOSAMIDES					
Clindamycin	2 µg	≥ 21	15-20	≤ 14	Inducible clindamycin resistance can be detected by disk diffusion using the D-zone test or by broth microdilution.15-µg erythromycin and 2-µg clindamycin disks spaced 15–26 mm apart. (See Table 3G)
ANSAMYCINS					
Rifampin	5 µg	≥ 20	17-19	≤ 16	Rifampin should be used but not reported. **Rifampin should not be used alone for antimicrobial therapy.**

***Enterococcus* spp.**					
Antimicrobial Agent	**Disk Content**	**Zone Diameter Interpretive Criteria (nearest whole mm)**			**Comments**
		S	**I**	**R**	
PENICILLINS					
Ampicillin	10 µg	≥ 17	-	≤ 16	The results of ampicillin susceptibility tests should be used to predict the activity of amoxicillin. Ampicillin results may be used to predict susceptibility to amoxicillin-clavulanate, ampicillin-sulbactam, and piperacillin-tazobactam among non–β-lactamase producing enterococci. Ampicillin susceptibility can be used to predict imipenem susceptibility, providing the species is confirmed to be *E. faecalis.*
GLYCOPEPTIDES					
Vancomycin	30 µg	≥ 17	15-16	≤ 14	When testing vancomycin against enterococci, plates should be held a full 24 hours for accurate detection of resistance. Zones should be examined using transmitted light; the presence of a haze or any growth within the zone of inhibition indicates resistance. Organisms with intermediate zones should be tested by an MIC method as described in M07-A10. For isolates for which the vancomycin MICs are 8 to 16 µg/mL, perform biochemical tests for identification as listed under the "Vancomycin MIC ≥ 8 µg/mL" test found in Table 3F.
FLUOROQUINOLONES					
Ciprofloxacin	5 µg	≥ 21	16–20	≤ 15	
NITROFURANTOINS					
Nitrofurantoin	300 µg	≥ 17	15-16	≤ 14	**For testing and reporting urinary tract isolates only**
OXAZOLIDINONES					
Linezolid	30 µg	≥ 23	21-22	≤ 20	

HIGH-LEVEL AMINOGLYCOSIDES for *Enterococcus* spp.					
Antimicrobial Agent	**Disk Content**	**Zone Diameter Interpretive Criteria (nearest whole mm)**			**Comments**
		S	**Inconclusive**	**R**	
Gentamicin	120 µg	≥ 10	7-9	= 6	

∗ For disk diffusion, test a maximum of 9 disks on a 150-mm plate and 4 disks on a 100-mm plate.

Streptococcus pneumoniae					
Antimicrobial Agent	**Disk Content**	**Zone Diameter Interpretive Criteria (nearest whole mm)**			**Comments**
		S	**I**	**R**	
PENICILLINS					
Penicillin (nonmeningitis)	1 µg Oxacillin	≥ 20	-	-	Isolates of pneumococci with oxacillin zone sizes of ≥20 mm are susceptible (MIC ≤ 0.06 µg/mL) to penicillin. Penicillin and cefotaxime, ceftriaxone, or meropenem MICs should be determined for those isolates with oxacillin zone diameters of ≤ 19 mm, because zones of ≤ 19 mm occur with penicillin-resistant, -intermediate, or certain -susceptible strains. For isolates with oxacillin zones ≤ 19 mm, do not report penicillin as resistant without performing a penicillin MIC test.
Penicillin parenteral (nonmeningitis) (optional)	-	-	-	-	MIC Interpretive Criteria (µg/mL) S: ≤ 2 | I: 4 | R: ≥ 8 Doses of intravenous penicillin of at least 2 million units every 4 hours in adults with normal renal function (12 million units per day) can be used to treat nonmeningeal pneumococcal infections due to strains with penicillin MICs ≤ 2 µg/mL. Strains with an intermediate MIC of 4 µg/mL may require penicillin doses of 18 to 24 million units per day.
CEPHEMS					
Ceftriaxone (nonmeningitis)	-	-	-	-	MIC Interpretive Criteria (µg/mL) S: ≤ 1 | I: 2 | R: ≥ 4
TETRACYCLINES					
Doxycycline	35 µg	≥ 28	25-27	≤ 24	**Organimes that are susceptible to tetracycline are also considered susceptible to doxycycline. However, resistance to doxycycline cannot be inferred from tetracycline resistance.**

Streptococcus pneumoniae (continued)					
MACROLIDES					
Erythromycin	15 µg	≥ 21	16-20	≤ 15	**(a) Susceptibility and resistance to azithromycin, clarithromycin, and dirithromycin can be predicted by testing erythromycin.** (b) Not routinely reported on organisms isolated from the urinary tract.
FLUOROQUINOLONES					
Levofloxacin	5 µg	≥ 17	14-16	≤ 13	
FOLATE PATHWAY INHIBITORS					
Trimethoprim-sulfamethoxazole	1.25/ 23.75 µg	≥ 19	16-18	≤ 15	
LINCOSAMIDES					
Clindamycin	2 µg	≥ 19	16-18	≤ 15	Inducible clindamycin resistance can be detected by disk diffusion using the D-zone test or by broth microdilution.15µg erythromycin and 2µg clindamycin disks spaced 15–26 mm apart. See Table 3G.