

Breakpoints Eliminated From CLSI Document M100 Since 2010

| Antimicrobial Agent | Disk Content | Interpretive Categories and Zone Diameter Breakpoints, nearest whole mm | | | Interpretive Categories and MIC Breakpoints, µg/mL | | | M100 Edition in Which Breakpoints Were Last Included/Comments | Rationale |
|---|--------------|---|-------|------|--|-------|-------|---|---|
| | | S | I | R | S | I | R | | |
| Enterobacteriales | | | | | | | | | |
| Cephalothin (surrogate test for uncomplicated UTI) | 30 µg | ≥ 18 | 15-17 | ≤ 14 | ≤ 8 | 16 | ≥ 32 | M100-S25 | Cefazolin is a more reliable surrogate than cephalothin for predicting results for oral cephalosporins that might be used for treatment of uncomplicated UTIs. |
| Nalidixic acid | 30 µg | ≥ 19 | 14-18 | ≤ 13 | ≤ 16 | - | ≥ 32 | M100S, 26th ed. Deleted for <i>Salmonella</i> spp. only | Nalidixic acid does not perform reliably in predicting susceptibility to fluoroquinolones that might be used for treatment of <i>Salmonella</i> infections. It has been shown to produce both false-resistant and false-susceptible results. ^{1,2} |
| Piperacillin | 100 µg | ≥ 21 | 18-20 | ≤ 17 | - | - | - | M100-Ed31 | Disk diffusion breakpoints deleted because disk correlates for revised MIC breakpoints were reassessed. |
| Ticarcillin | 75 µg | ≥ 20 | 15-19 | ≤ 14 | ≤ 16 | 32-64 | ≥ 128 | M100-S25 | This agent is no longer available. |
| <i>Pseudomonas aeruginosa</i> | | | | | | | | | |
| Cefoperazone | 75 µg | ≥ 21 | 16-20 | ≤ 15 | ≤ 16 | 32 | ≥ 64 | M100-S20 | These agents are no longer available or have limited indications for <i>P. aeruginosa</i> . |
| Cefotaxime | 30 µg | ≥ 23 | 15-22 | ≤ 14 | ≤ 8 | 16-32 | ≥ 64 | M100-S20 | |
| Ceftizoxime | 30 µg | ≥ 20 | 15-19 | ≤ 14 | ≤ 8 | 16-32 | ≥ 64 | M100-S20 | |
| Ceftriaxone | 30 µg | ≥ 21 | 14-20 | ≤ 13 | ≤ 8 | 16-32 | ≥ 64 | M100-S20 | |
| Moxalactam | 30 µg | ≥ 23 | 15-22 | ≤ 14 | ≤ 8 | 16-32 | ≥ 64 | M100-S20 | |
| Ticarcillin | 75 µg | ≥ 24 | 16-23 | ≤ 15 | ≤ 16 | 32-64 | ≥ 128 | M100-S25 | |
| <i>Acinetobacter</i> spp. | | | | | | | | | |
| Mezlocillin | 75 µg | ≥ 21 | 18-20 | ≤ 17 | ≤ 16 | 32-64 | ≥ 128 | M100-S25 | These agents are no longer available. |
| Ticarcillin | 75 µg | ≥ 20 | 15-19 | ≤ 14 | ≤ 16 | 32-64 | ≥ 128 | M100-S25 | |
| Other Non-Enterobacteriales | | | | | | | | | |
| Carbenicillin | N/A | - | - | - | ≤ 16 | 32 | ≥ 64 | M100-S25 | These agents are no longer available. |
| Mezlocillin | N/A | - | - | - | ≤ 16 | 32-64 | ≥ 128 | | |
| Ticarcillin | N/A | - | - | - | ≤ 16 | 32-64 | ≥ 128 | | |
| <i>Staphylococcus</i> spp. | | | | | | | | | |
| Oxacillin (<i>S. aureus</i> / <i>S. lugdunensis</i>) | 1 µg | ≥ 13 | 11-12 | ≤ 10 | - | - | - | M100-S22 | Oxacillin disk diffusion performance is inferior to that of cefoxitin for detection of <i>mecA</i> -mediated oxacillin resistance. |

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|--|--------------|---|-------|------|--|-------|---------|---|--|
| | | S | I | R | S | I | R | | |
| Staphylococcus spp. (Continued) | | | | | | | | | |
| Amoxicillin-clavulanate | 20/10 µg | ≥ 20 | - | ≤ 19 | ≤ 4/2 | - | ≥ 8/4 | M100-S22 | There are limited data available to demonstrate the predictive value of testing these β-lactam agents against staphylococci. Consequently, susceptibility results for antistaphylococcal β-lactams other than penicillin and oxacillin (cefoxitin) are best determined by deducing results from testing penicillin and oxacillin (cefoxitin). An exception is for ceftaroline, which must be tested if ceftaroline results are requested. ³ |
| Ampicillin-sulbactam | 10/10 µg | ≥ 15 | 12-14 | ≤ 11 | ≤ 8/4 | 16/8 | ≥ 32/16 | | |
| Piperacillin-tazobactam | 100/10 µg | ≥ 18 | - | ≤ 17 | ≤ 8/4 | - | ≥ 16/4 | | |
| Ticarcillin-clavulanate | 75/10 µg | ≥ 23 | - | ≤ 22 | ≤ 8/2 | - | ≥ 16/2 | | |
| Cefaclor | 30 µg | ≥ 18 | 15-17 | ≤ 14 | ≤ 8 | 16 | ≥ 32 | | |
| Cefamandole | 30 µg | ≥ 18 | 15-17 | ≤ 14 | ≤ 8 | 16 | ≥ 32 | | |
| Cefazolin | 30 µg | ≥ 18 | 15-17 | ≤ 14 | ≤ 8 | 16 | ≥ 32 | | |
| Cefepime | 30 µg | ≥ 18 | 15-17 | ≤ 14 | ≤ 8 | 16 | ≥ 32 | | |
| Cefdinir | 5 µg | ≥ 20 | 17-19 | ≤ 16 | ≤ 1 | 2 | ≥ 4 | | |
| Cefmetazole | 30 µg | ≥ 16 | 13-15 | ≤ 12 | ≤ 16 | 32 | ≥ 64 | | |
| Cefonicid | 30 µg | ≥ 18 | 15-17 | ≤ 14 | ≤ 8 | 16 | ≥ 32 | | |
| Cefoperazone | 75 µg | ≥ 21 | 16-20 | ≤ 15 | ≤ 16 | 32 | ≥ 64 | | |
| Cefotaxime | 30 µg | ≥ 23 | 15-22 | ≤ 14 | ≤ 8 | 16-32 | ≥ 64 | | |
| Cefotetan | 30 µg | ≥ 16 | 13-15 | ≤ 12 | ≤ 16 | 32 | ≥ 64 | | |
| Cefpodoxime | 10 µg | ≥ 21 | 18-20 | ≤ 17 | ≤ 2 | 4 | ≥ 8 | | |
| Cefprozil | 30 µg | ≥ 18 | 15-17 | ≤ 14 | ≤ 8 | 16 | ≥ 32 | | |
| Ceftazidime | 30 µg | ≥ 18 | 15-17 | ≤ 14 | ≤ 8 | 16 | ≥ 32 | | |
| Ceftizoxime | 30 µg | ≥ 20 | 15-19 | ≤ 14 | ≤ 8 | 16-32 | ≥ 64 | | |
| Ceftriaxone | 30 µg | ≥ 21 | 14-20 | ≤ 13 | ≤ 8 | 16-32 | ≥ 64 | | |
| Cefuroxime (oral) | 30 µg | ≥ 23 | 15-22 | ≤ 14 | ≤ 4 | 8-16 | ≥ 32 | | |
| Cefuroxime (parenteral) | 30 µg | ≥ 18 | 15-17 | ≤ 14 | ≤ 8 | 16 | ≥ 32 | | |
| Cephalothin | 30 µg | ≥ 18 | 15-17 | ≤ 14 | ≤ 8 | 16 | ≥ 32 | | |
| Loracarbef | 30 µg | ≥ 18 | 15-17 | ≤ 14 | ≤ 8 | 16 | ≥ 32 | | |
| Moxalactam | 30 µg | ≥ 23 | 15-22 | ≤ 14 | ≤ 8 | 16-32 | ≥ 64 | | |
| Doripenem | 10 µg | ≥ 30 | - | - | ≤ 0.5 | - | - | | |
| Ertapenem | 10 µg | ≥ 19 | 16-18 | ≤ 15 | ≤ 2 | 4 | ≥ 8 | | |
| Imipenem | 10 µg | ≥ 16 | 14-15 | ≤ 13 | ≤ 4 | 8 | ≥ 16 | | |
| Meropenem | 10 µg | ≥ 16 | 14-15 | ≤ 13 | ≤ 4 | 8 | ≥ 16 | | |
| Amikacin | 30 µg | ≥ 17 | 15-16 | ≤ 14 | ≤ 16 | 32 | ≥ 64 | M100, 27th ed. | According to current guidelines, if an aminoglycoside is warranted, only gentamicin in combination with another active drug should be used for treatment of methicillin-resistant staphylococcal infections; none of these other aminoglycosides should be considered. |
| Kanamycin | 30 µg | ≥ 18 | 14-17 | ≤ 13 | ≤ 16 | 32 | ≥ 64 | | |
| Netilmicin | 30 µg | ≥ 15 | 13-14 | ≤ 12 | ≤ 8 | 16 | ≥ 32 | | |
| Tobramycin | 10 µg | ≥ 15 | 13-14 | ≤ 12 | ≤ 4 | 8 | ≥ 16 | M100, 28th ed. | This agent is no longer available. |
| Telithromycin | 15 µg | ≥ 22 | 19-21 | ≤ 18 | ≤ 1 | 2 | ≥ 4 | | |

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|--|--------------|---|-------|------|--|--------|-------|---|---|
| | | S | I | R | S | I | R | | |
| Anaerobes | | | | | | | | | |
| Mezlocillin | N/A | - | - | - | ≤ 32 | 64 | ≥ 128 | M100-S25 | These agents are no longer available. |
| Ticarcillin | N/A | - | - | - | ≤ 32 | 64 | ≥ 128 | | |
| Piperacillin | N/A | - | - | - | ≤ 32 | 64 | ≥ 128 | M100, 30th ed. | This agent is no longer available. |
| Haemophilus influenzae and Haemophilus parainfluenzae | | | | | | | | | |
| Amoxicillin-clavulanate | 20/10 µg | ≥ 20 | - | ≤ 19 | - | - | - | M100-Ed31 | These breakpoints do not correlate with revised MIC breakpoints. |
| Telithromycin | 15 µg | ≥ 15 | 12-14 | ≤ 11 | ≤ 4 | 8 | ≥ 16 | M100, 28th ed. | This agent is no longer available. |
| Neisseria gonorrhoeae | | | | | | | | | |
| Cefuroxime | 30 µg | ≥ 31 | 26-30 | ≤ 25 | ≤ 1 | 2 | ≥ 4 | M100, 28th ed. | These agents currently have no role in the management of gonococcal infections. They are not on the list of recommended treatments, in contemporary treatment guidelines for uncomplicated infections, or for special situations. |
| Cefmetazole | 30 µg | ≥ 33 | 28-32 | ≤ 27 | ≤ 2 | 4 | ≥ 8 | | |
| Ceftazidime | 30 µg | ≥ 31 | - | - | ≤ 0.5 | - | - | | |
| Cefetamet | 10 µg | ≥ 29 | - | - | ≤ 0.5 | - | - | | |
| Enoxacin | 10 µg | ≥ 36 | 32-35 | ≤ 31 | ≤ 0.5 | 1 | ≥ 2 | | |
| Fleroxacin | 5 µg | ≥ 35 | 29-34 | ≤ 28 | ≤ 0.25 | 0.5 | ≥ 1 | | |
| Lomefloxacin | 10 µg | ≥ 38 | 27-37 | ≤ 26 | ≤ 0.12 | 0.25-1 | ≥ 2 | | |
| Ofloxacin | 5 µg | ≥ 31 | 25-30 | ≤ 24 | ≤ 0.25 | 0.5-1 | ≥ 2 | | |
| Streptococcus pneumoniae | | | | | | | | | |
| Telithromycin | 15 µg | ≥ 19 | 16-18 | ≤ 15 | ≤ 1 | 2 | ≥ 4 | M100, 28th ed. | This agent is no longer available. |

Abbreviations: I, intermediate; MIC, minimal inhibitory concentration; R, resistant; S, susceptible; UTI, urinary tract infection.

References

- Deak E, Skov R, Hindler JA, Humphries RM. Evaluation of surrogate disk tests for detection of ciprofloxacin and levofloxacin resistance in clinical isolates of *Salmonella enterica*. *J Clin Microbiol*. 2015;53(11):3405-3410.
- Skov R, Matuschek E, Sjölund-Karlsson M, et al. Development of a pefloxacin disk diffusion method for detection of fluoroquinolone-resistant *Salmonella enterica*. *J Clin Microbiol*. 2015;53(11):3411-3417.
- Dien Bard J, Hindler JA, Gold HS, Limbago B. Rationale for eliminating *Staphylococcus* breakpoints for β-lactam agents other than penicillin, oxacillin or ceftoxitin, and ceftaroline. *Clin Infect Dis*. 2014;58(9):1287-1296.