

Table 2H-2. Zone Diameter and MIC Breakpoints for *Streptococcus* spp. Viridans Group

Testing Conditions		QC Recommendations
Medium:	Disk diffusion: MHA with 5% sheep blood Broth dilution: CAMHB with LHB (2.5% to 5% v/v); the CAMHB should be supplemented to 50 µg/mL calcium for daptomycin (see CLSI M07 ¹ for instructions for preparation of LHB). Agar dilution: MHA with sheep blood (5% v/v); recent studies using the agar dilution method have not been performed and reviewed by the subcommittee	Refer to the following: <ul style="list-style-type: none"> • Tables 4B and 5B that list acceptable QC ranges applicable for each method • Appendix I to develop a QC plan When a commercial test system is used for antimicrobial susceptibility testing, refer to the manufacturer's instructions for QC strains and QC ranges.
Inoculum:	Colony suspension, equivalent to a 0.5 McFarland standard using colonies from an overnight (18- to 20-hour) sheep blood agar plate	
Incubation:	35°C ± 2°C Disk diffusion: 5% CO ₂ ; 20-24 hours Dilution methods: ambient air; 20-24 hours (CO ₂ if necessary, for growth with agar dilution)	

General Comments

- (1) Refer to Table 1H-2 for antimicrobial agents that should be considered for testing and reporting by microbiology laboratories.
- (2) For disk diffusion, measure the diameter of the zones of complete inhibition (as judged by the unaided eye), including the diameter of the disk. The zone margin should be considered the area showing no obvious, visible growth that can be detected with the unaided eye. Do not measure the zone of inhibition of hemolysis. Measure the zones from the upper surface of the agar illuminated with reflected light, with the cover removed. Ignore faint growth of tiny colonies that can be detected only with a magnifying lens at the edge of the zone of inhibited growth.
- (3) For viridans streptococci when testing chloramphenicol, clindamycin, erythromycin, linezolid, tedizolid, and tetracycline by broth microdilution MIC, trailing growth can make end point determination difficult. In such cases, read the MIC at the lowest concentration where the trailing begins. Tiny buttons of growth should be ignored (see CLSI M07¹).
- (4) The viridans group of streptococci includes the following 5 groups, with several species within each group: *S. mutans* group, *S. salivarius* group, *S. bovis* group, *S. anginosus* group (previously *S. milleri* group), and *S. mitis* group. The *S. anginosus* group includes small colony-forming β-hemolytic strains with groups A, C, F, and G antigens. For detailed information on the species within the groups, refer to recent literature.

Table 2H-2. *Streptococcus* spp. Viridans Group (Continued)

- (5) Breakpoints for *Streptococcus* spp. viridans group are proposed based on population distributions of various species, pharmacokinetics of the antimicrobial agents, previously published literature, and the clinical experience of subcommittee members. Systematically collected clinical data were not available for review with many of the antimicrobial agents in this table.

Antimicrobial Agent	Disk Content	Interpretive Categories and Zone Diameter Breakpoints, Nearest Whole mm			Interpretive Categories and MIC Breakpoints, $\mu\text{g}/\text{mL}$			Comments
		S	I	R	S	I	R	
PENICILLINS								
Penicillin	–	–	–	–	≤ 0.12	0.25-2	≥ 4	<p>(6) Viridans streptococci isolated from normally sterile anatomical sites (eg, CSF, blood, bone) should be tested for penicillin susceptibility using an MIC method.</p> <p>(7) A penicillin MIC of $\leq 0.125 \mu\text{g}/\text{mL}$ is the same as a penicillin MIC of $\leq 0.12 \mu\text{g}/\text{mL}$ and both should be interpreted as susceptible. Laboratories should report an MIC of $\leq 0.125 \mu\text{g}/\text{mL}$ as $\leq 0.12 \mu\text{g}/\text{mL}$.</p> <p>(8) Rx: Penicillin- or ampicillin-intermediate isolates may necessitate combined therapy with an aminoglycoside for bactericidal action.</p>
Ampicillin	–	–	–	–	≤ 0.25	0.5-4	≥ 8	
β-LACTAM COMBINATION AGENTS								
Ceftolozane-tazobactam	–	–	–	–	$\leq 8/4$	16/4	$\geq 32/4$	
CEPHEMS (PARENTERAL) (Including cephalosporins I, II, III, and IV. Please refer to Glossary I.)								
Cefepime	30 μg	≥ 24	22-23	≤ 21	≤ 1	2	≥ 4	
Cefotaxime	30 μg	≥ 28	26-27	≤ 25	≤ 1	2	≥ 4	
Ceftriaxone	30 μg	≥ 27	25-26	≤ 24	≤ 1	2	≥ 4	
CARBAPENEMS								
Doripenem*	–	–	–	–	≤ 1	–	–	
Ertapenem*	–	–	–	–	≤ 1	–	–	
Meropenem*	–	–	–	–	≤ 0.5	–	–	
GLYCOPEPTIDES								
Vancomycin	30 μg	≥ 17	–	–	≤ 1	–	–	

Table 2H-2. *Streptococcus* spp. Viridans Group (Continued)

Antimicrobial Agent	Disk Content	Interpretive Categories and Zone Diameter Breakpoints, Nearest Whole mm			Interpretive Categories and MIC Breakpoints, µg/mL			Comments
		S	I	R	S	I	R	
LIPOGLYCOPEPTIDES								
Dalbavancin	–	–	–	–	≤ 0.25	–	–	(9) Report only on <i>S. anginosus</i> group (including <i>S. anginosus</i> , <i>S. intermedius</i> , and <i>S. constellatus</i>).
Oritavancin	–	–	–	–	≤ 0.25	–	–	
Telavancin	–	–	–	–	≤ 0.06	–	–	
LIPOPEPTIDES								
Daptomycin*	–	–	–	–	≤ 1	–	–	(10) Not routinely reported on organisms isolated from the lower respiratory tract.
MACROLIDES								
(11) Susceptibility and resistance to azithromycin, clarithromycin, and dirithromycin can be predicted by testing erythromycin.								
(12) Not routinely reported on organisms isolated from the urinary tract.								
Erythromycin	15 µg	≥ 21	16-20	≤ 15	≤ 0.25	0.5	≥ 1	
Azithromycin*	15 µg	≥ 18	14-17	≤ 13	≤ 0.5	1	≥ 2	
Clarithromycin*	15 µg	≥ 21	17-20	≤ 16	≤ 0.25	0.5	≥ 1	
Dirithromycin*	15 µg	≥ 18	14-17	≤ 13	≤ 0.5	1	≥ 2	
TETRACYCLINES								
(13) Isolates that test susceptible to tetracycline are considered susceptible to doxycycline and minocycline.								
Tetracycline*	30 µg	≥ 23	19-22	≤ 18	≤ 2	4	≥ 8	
FLUOROQUINOLONES								
Levofloxacin	5 µg	≥ 17	14-16	≤ 13	≤ 2	4	≥ 8	
Ofloxacin*	5 µg	≥ 16	13-15	≤ 12	≤ 2	4	≥ 8	
Gatifloxacin*	5 µg	≥ 21	18-20	≤ 17	≤ 1	2	≥ 4	
Grepafloxacin*	5 µg	≥ 19	16-18	≤ 15	≤ 0.5	1	≥ 2	
Trovafloxacin*	10 µg	≥ 19	16-18	≤ 15	≤ 1	2	≥ 4	
PHENICOLS								
Chloramphenicol*	30 µg	≥ 21	18-20	≤ 17	≤ 4	8	≥ 16	See comment (12).

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Antimicrobial Agent	Disk Content	Interpretive Categories and Zone Diameter Breakpoints, Nearest Whole mm			Interpretive Categories and MIC Breakpoints, µg/mL			Comments
		S	I	R	S	I	R	
LINCOSAMIDES								
Clindamycin	2 µg	≥ 19	16-18	≤ 15	≤ 0.25	0.5	≥ 1	See comment (12).
STREPTOGRAMINS								
Quinupristin-dalfopristin*	15 µg	≥ 19	16-18	≤ 15	≤ 1	2	≥ 4	
OXAZOLIDINONES								
(14) <i>S. anginosus</i> group that test susceptible to linezolid are considered susceptible to tedizolid. Isolates that test nonsusceptible to linezolid should be tested against tedizolid if that result is needed for treatment.								
Linezolid	30 µg	≥ 21	–	–	≤ 2	–	–	
Tedizolid	2 µg	≥ 18	–	–	≤ 0.25	–	–	See comment (9).

Abbreviations: CAMHB, cation-adjusted Mueller-Hinton broth; CO₂, carbon dioxide; CSF, cerebrospinal fluid; I, intermediate; LHB, lysed horse blood; MHA, Mueller-Hinton agar; MIC, minimal inhibitory concentration; QC, quality control; R, resistant; S, susceptible.
 Symbol: *, designation for “Other” agents that are not included in Tables 1 but have established clinical breakpoints.

Reference for Table 2H-2

¹ CLSI. *Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria That Grow Aerobically*. 12th ed. CLSI standard M07. Clinical and Laboratory Standards Institute; 2024.