

Rule No.	Organism(s)	Indicator Agent	Agents Affected	Rule	Remarks	Grade	References
<b>Beta-lactams</b>							
1	Beta-haemolytic streptococci (Group A, B, C, G)	benzylpenicillin	aminopenicillins, cephalosporins and carbapenems	IF susceptible to benzylpenicillin, THEN report susceptible to aminopenicillins, cephalosporins and carbapenems.  IF resistant to benzylpenicillin, THEN confirm species identification and determine and report according to the MIC of the relevant agent.	Rare isolates of group B streptococci may have diminished susceptibility to penicillins No resistance to beta-lactams reported so far except in Group B streptococci (MIC of benzylpenicillin up to 1 mg/L).  If beta-haemolytic streptococci including GBS test resistant to penicillin check identification and susceptibility	C	Dahesh S et al., 2008 Hayes et al, 2020
2	Viridans group streptococci	benzylpenicillin screening test	aminopenicillins and cefotaxime or ceftriaxone	IF the benzylpenicillin screening test is negative (susceptible), THEN report susceptible to any indicated beta-lactam agent;  IF the benzylpenicillin screening test is positive (resistant), THEN isolates should be tested for susceptibility to individual agents OR report as resistant	Production of mosaic PBPs leads to various patterns of beta-lactam resistance so in case of resistance to benzylpenicillin the results of other drugs cannot be inferred	C	Pottumarthy & Morris, 1998
<b>Macrolides, lincosamides and streptogramins</b>							
3	<i>Streptococcus spp.</i>	erythromycin, clindamycin	clindamycin	IF resistant to erythromycin AND susceptible to clindamycin, THEN test for inducible MLS <sub>B</sub> resistance  IF negative for inducibility THEN report clindamycin susceptible  IF positive for inducibility THEN report clindamycin resistant	Streptococci resistant to macrolides but susceptible to clindamycin produce Erm ribosomal methylases conferring the inducible MLS <sub>B</sub> phenotype or express efflux pumps. In the case of inducible MLS <sub>B</sub> resistance, constitutively resistant mutants can be selected by clindamycin.  Adding a note may be considered, stating that clindamycin, if testing susceptible, may still be used in less severe skin and soft tissue infections.	A	Lewis et al., 2014

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					For beta-haemolytic streptococci a note may be considered stating that clindamycin, if testing susceptible, even in the presence of inducible MLS <sub>B</sub> resistance, may be used in combinations when reduction of toxin synthesis is desired, such as streptococcal fasciitis		
<b>Fluoroquinolones</b>							
4	<i>Streptococcus</i> spp. A, B, C, G	norfloxacin screening test	levofloxacin, moxifloxacin	<p>If the norfloxacin screening test is negative (susceptible), THEN report levofloxacin as "susceptible, increased exposure" and moxifloxacin as "susceptible"</p> <p>If the norfloxacin screening test is positive (resistant), THEN isolates should be tested for susceptibility to levofloxacin and moxifloxacin OR report as resistant</p>	As with other gram-positive organisms, first step mutants as well as overexpressed efflux pumps are detected with norfloxacin; therefore, norfloxacin susceptible isolates can be reported as susceptible to the other fluoroquinolones.	A	Petrelli et al., 2014; Pinho et al., 2010
<b>Aminoglycosides</b>							
5	<i>Streptococcus</i> spp.	gentamicin	gentamicin	<p>IF high-level resistance to gentamicin is detected, THEN report with a cautionary warning that combinations of a beta-lactam with gentamicin may not be synergistic</p> <p>IF high-level resistance to gentamicin is not detected, THEN report gentamicin as effective for synergy purposes</p> <p>NOTE: this rule applies to isolates from endocarditis only.</p>	High-level resistance to aminoglycosides has been detected in viridans streptococci as well as in group B streptococci. There are in vitro data suggesting reduced synergy in such isolates; however, clinical or experimental data showing increased failure rates are lacking. Analogous to enterococci, combinations of beta-lactams with aminoglycosides in therapy should be approached with caution.	C	Farber & Yee, 1987; Kaufhold & Potgieter, 1993; Doumith et al., 2017

**References**

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