

Commonly Used Abbreviations for Describing Antibiotic Resistance

Table 1. Common Abbreviations

Abbreviation	Definition / Comment
<i>Organism Non-Specific Abbreviations</i>	
MDR	<ul style="list-style-type: none"> - Multidrug resistant - Non-susceptibility¹ to >1 agent in ≥3 antibiotic categories²
XDR	<ul style="list-style-type: none"> - Extensively drug resistant - Non-susceptibility to >1 agent in all but ≤2 antibiotic categories (or susceptible only to ≤2 antibiotic categories)
PDR	<ul style="list-style-type: none"> - Pan drug resistant - Non-susceptibility to all agents in all antibiotic categories
<i>Abbreviation Specific to Gram-Negative Microorganisms</i>	
ESBL	<ul style="list-style-type: none"> - Extended-spectrum β-lactamase - Enzyme capable of inactivating penicillins, most cephalosporins (except ceftazidime, cefotetan) and aztreonam - Inhibited by β-lactamase inhibitors (e.g., clavulanate) <i>in vitro</i> - Enterobacteriaceae with ceftazidime, aztreonam, cefotaxime, or ceftriaxone MIC³ ≥2 µg/mL may harbor ESBL
CRE	<ul style="list-style-type: none"> - Carbapenem-resistant <i>Enterobacteriaceae</i> - <i>Enterobacteriaceae</i> (e.g., <i>E coli</i>, <i>Klebsiella pneumoniae</i>) resistant to any carbapenems (imipenem, meropenem, doripenem or ertapenem) - Resistance can be mediated through antibiotic efflux, change in drug target, or production of inactivating enzymes (carbapenemases) - For CDC reporting purposes, CRE is any <i>E coli</i>, <i>K oxytoca</i>, <i>K pneumoniae</i>, or <i>Enterobacter spp</i> testing resistant to any carbapenems
CPE	<ul style="list-style-type: none"> - Carbapenemase-producing CRE - <i>Enterobacteriaceae</i> that are resistant to carbapenem due to production of inactivating enzymes or carbapenemases (e.g., KPC, VIM, IMP, NDM)
<i>Abbreviation Specific to Gram-Positive Microorganisms</i>	
MRSA	<ul style="list-style-type: none"> - Methicillin-resistant <i>Staphylococcus aureus</i> - <i>S aureus</i> that are resistant to all β-lactam antibiotics (including penicillins +/- β-lactamase inhibitors, cephalosporins +/- β-lactamase inhibitors, carbapenems) except ceftaroline
VISA	<ul style="list-style-type: none"> - Vancomycin-intermediate <i>Staphylococcus aureus</i> - <i>S aureus</i> with vancomycin MIC between 4 to 8 µg/mL
VRSA	<ul style="list-style-type: none"> - Vancomycin-resistant <i>Staphylococcus aureus</i> - <i>S aureus</i> with vancomycin MIC ≥ 16 µg/mL
VRE	<ul style="list-style-type: none"> - Vancomycin-resistant enterococcus - <i>E faecalis</i>, <i>E faecium</i>, or other <i>Enterococcus spp</i> that is resistant to vancomycin based on results from standard susceptibility testing

1. Non-susceptibility refers to either a resistant, intermediate or non-susceptible result from antibiotic susceptibility testing. When an organism exhibits intrinsic resistance to an antimicrobial category/agent, that category/agent **must be removed** from consideration for non-susceptibility.
2. Antibiotic categories for consideration of non-susceptibility are organism-specific. Refer to Tables 2 and 3 for complete listings.
3. MIC = minimum inhibitory concentration

Table 2. Antimicrobial Categories/Agents Used to Define MDR, XDR and PDR in *Enterobacteriaceae*, *Pseudomonas aeruginosa*, and *Acinetobacter* spp.

Antimicrobial Category / Antimicrobial Agent	<i>Enterobacteriaceae</i>			Antimicrobial Category / Antimicrobial Agent	<i>Enterobacteriaceae</i>		
	<i>P aeruginosa</i>		<i>Acinetobacter</i> spp.		<i>P aeruginosa</i>		<i>Acinetobacter</i> spp.
Carbapenems <i>Antipseudomonal</i> Imipenem Meropenem Doripenem	√	√	√	Aminoglycosides Gentamicin ⁷ Tobramycin ⁷ Amikacin	√	√	√
<i>Non-antipseudomonal</i> Ertapenem	√						
Anti-MRSA cephalosporin Ceftaroline	√			Monobactam Aztreonam	√	√	
Extended-spectrum cephalosporins <i>Antipseudomonal</i> Ceftazidime Cefepime	√	√	√	Fluoroquinolones Ciprofloxacin Levofloxacin	√	√	√
<i>3rd-generation</i> Cefotaxime Ceftriaxone	√		√	Folate inhibitor Trimethoprim/sulfamethoxazole	√		√
Cephameycins¹ Cefoxitin Cefotetan	√			Tetracyclines⁸ Tetracycline ⁹ Doxycycline Minocycline	√	√	√
Non-extended-spectrum cephalosporins Cefazolin ² Cefuroxime ³	√			Glycylcycline Tigecycline ¹⁰	√		√
Penicillins + β-lactamase inhibitors <i>Antipseudomonal</i> Piperacillin-tazobactam ⁴	√	√	√	Polymyxins¹¹ Colistin Polymyxin B	√	√	√
<i>Non-antipseudomonal</i> Ampicillin-sulbactam ⁵	√		√				
Penicillin Ampicillin ⁶	√			Phosphonic acids Fosfomycin	√	√	

- Intrinsic resistance in *Citrobacter freundii*, *Enterobacter aerogenes*, *Enterobacter cloacae*, *Hafnia alvei*, *Serratia marcescens*
- Intrinsic resistance in *C freundii*, *E aerogenes*, *E cloacae*, *H alvei*, *Morganella morganii*, *Proteus penneri*, *Proteus vulgaris*, *Providencia rettgeri*, *Providentica stuartii*, *S marcescens*
- Intrinsic resistance in *C freundii*, *E aerogenes*, *E cloacae*, *M morganii*, *P penneri*, *P vulgaris*, *S marcescens*
- Intrinsic resistance in *Escherichia hermannii*
- Intrinsic resistance in *C freundii*, *Citrobacter koseri*, *E aerogenes*, *E cloacae*, *H alvei*, *P rettgeri*, *S marcescens*
- Intrinsic resistance in *C freundii*, *C koseri*, *E aerogenes*, *E cloacae*, *E hermannii*, *H alvei*, *Klebsiella* spp., *M morganii*, *P penneri*, *P vulgaris*, *P rettgeri*, *P stuartii*, *S marcescens*
- Intrinsic resistance in *P rettgeri*, *P stuartii*
- Intrinsic resistance in *M morganii*, *P penneri*, *P vulgaris*, *P rettgeri*, *P stuartii*
- In addition to intrinsic resistance indicated in footnote 8, intrinsic resistance also found in *Proteus mirabilis*
- Intrinsic resistance in *M morganii*, *P mirabilis*, *P penneri*, *P vulgaris*, *P rettgeri*, *P stuartii*
- Intrinsic resistance in *M morganii*, *P mirabilis*, *P penneri*, *P vulgaris*, *P rettgeri*, *P stuartii*, *S marcescens*

Table 3. Antimicrobial Categories/Agents Used to Define MDR, XDR and PDR in *Staphylococcus aureus* and *Enterococcus* spp.

Antimicrobial Category / Antimicrobial Agent	<i>S aureus</i>		Antimicrobial Category / Antimicrobial Agent	<i>S aureus</i>	
	<i>S aureus</i>	<i>Enterococcus</i> spp.		<i>S aureus</i>	<i>Enterococcus</i> spp.
Aminoglycosides Gentamicin Streptomycin	√	√ √	Licosamide Clindamycin	√	
Anti-MRSA cephalosporin Ceftaroline	√		Lipopeptides Daptomycin	√	√
Anti-staphylococcal β-lactam Oxacillin	√		Macrolide Erythromycin	√	
Carbapenems¹ Imipenem Meropenem Doripenem		√	Oxazolidinones Linezolid	√	√
Fluoroquinolones Ciprofloxacin Moxifloxacin Levofloxacin	√	√	Penicillin Ampicillin		√
Folate inhibitor Trimethoprim/sulfamethoxazole	√		Phosphonic acids Fosfomycin	√	√
Fucidane Fusidic acid	√		Rifamycin Rifampin	√	
Glycopeptides Vancomycin Telavancin	√	√	Streptogramins² Quinupristin-dalfopristin	√	√
Glycylcycline Tigecycline	√	√	Tetracyclines Tetracycline Doxycycline Minocycline	√	√

1. Intrinsic resistance in *Enterococcus faecium*
2. Intrinsic resistance in *Enterococcus faecalis*

Reference

1. Magiorakos AP, Srinivasan A, Carey RB, *et al.* Multidrug-resistant, extensively drug-resistant and pandrug-resistant bacteria: an international expert proposal for interim standard definitions for acquired resistance. Clin Microbiol Infect 2012;18:268-81.
2. Multidrug-resistant organism and *Clostridium difficile* infection (MDRO/CDI) module. http://www.cdc.gov/nhsn/PDFs/pscManual/12pscMDRO_CDADcurrent.pdf. Accessed March 23rd, 2018.
3. Clinical and Laboratory Standards Institute (CLSI). Performance standards for antimicrobial susceptibility testing. 26th ed. CLSI supplement M100S. Wayne, PA, 2016.