

# Expected Susceptible Phenotypes

## Version 1.1 March 2022

This document is based on previous document “Intrinsic Resistance and Unusual Phenotypes” version 3.3, October 2021. Since then EUCAST has decided to abandon the term “intrinsic resistance” because of the difficulties identified when discussing the term “intrinsic”. The document has been divided into “Expected resistant phenotypes” and “Expected susceptible phenotypes” organised by species, and together with “Expert rules” they are available on [https://www.eucast.org/expert\\_rules\\_and\\_intrinsic\\_resistance/](https://www.eucast.org/expert_rules_and_intrinsic_resistance/).

## Definitions of “Expected Phenotypes” and “Expert Rules”

### Expected Phenotypes

The purpose of the Expected phenotypes tables is to serve as a tool for the validation of species identification, to aid in the validation of susceptibility test results and to prevent unnecessary susceptibility testing. The presence of an unexpected phenotype indicates that the laboratory should check the species identification, the susceptibility test results or both.

A microorganism is listed as an “expected phenotype” for an agent (or group of agents) because the vast majority of isolates are resistant (expected resistant phenotype) or in another case, susceptible (expected susceptible phenotype).

**Expected Resistant phenotype** (previously categorized as intrinsic resistance). When isolates of a species (or group of species) are generally and universally resistant (>90% of all isolates irrespective of origin exhibit a characteristic resistance mechanism or MIC values above the PK/PD breakpoint listed in the EUCAST tables), a susceptible result should be viewed with suspicion. Testing should normally be avoided, and laboratories are expected to either not report a result at all, or if a result is desired, to report the isolate as resistant without testing. Clinical colleagues should be advised against using the agent for the species in question. In the tables below where there is an “R”, any other result is unexpected.

**Expected Susceptible phenotype.** When isolates of a species (or group of species) are generally and universally expected to be susceptible (>99% of all isolates susceptible to the agent irrespective of origin because resistance mechanisms of clinical significance have not been reported and/or because MIC-values are consistently below the PK/PD breakpoint listed in EUCAST tables), a resistant result should be viewed with suspicion (Tables below). If testing is performed, unexpected test results indicate problems with species identification and/or susceptibility tests and results should be confirmed with alternative methods. When the resistant result is thought to reflect an acquired resistance mechanism this must be confirmed by reference methodology and preferably also by sequencing of the genome.

**Table 1** Expected susceptible phenotype (resistance not expected) in gram-negative bacteria

Rule	Organisms	Unusual phenotypes
1.1	Any <i>Enterobacterales</i> (except <i>Morganellaceae</i> and <i>Serratia marcescens</i> )	Resistant to colistin <sup>1,2</sup>
1.2	<i>Salmonella</i> Typhi	Resistant to carbapenems
1.3	<i>Pseudomonas aeruginosa</i> and <i>Acinetobacter</i> spp.	Resistant to colistin <sup>1</sup>
1.4	<i>Haemophilus influenzae</i>	Resistant to any third-generation cephalosporin, carbapenems, fluoroquinolones <sup>3</sup>
1.5	<i>Moraxella catarrhalis</i>	Resistant to any third-generation cephalosporin or fluoroquinolones
1.6	<i>Neisseria meningitidis</i>	Resistant to any third generation cephalosporins or fluoroquinolones
1.7	<i>Neisseria gonorrhoeae</i>	Resistant to spectinomycin

<sup>1</sup> Except in countries where colistin resistance is not rare.

<sup>2</sup> Colistin MICs for some *Salmonella* serotypes are slightly above the breakpoint (S ≤2; R >2 mg/L).

<sup>3</sup> Except in countries where fluoroquinolone resistance is not rare.

**Table 2 Expected susceptible phenotype (resistance not expected) in gram-positive bacteria**

Rule	Organisms	Unusual phenotypes
2.1	<i>Staphylococcus aureus</i>	Resistant to vancomycin, teicoplanin, telavancin, dalbavancin, oritavancin, daptomycin, linezolid, tedizolid, quinupristin-dalfopristin, tigecycline, eravacycline or omadacycline
2.2	Coagulase-negative staphylococci	Resistant to vancomycin, telavancin, dalbavancin, oritavancin, daptomycin, linezolid <sup>1</sup> , tedizolid <sup>1</sup> , quinupristin-dalfopristin <sup>1</sup> , tigecycline, eravacycline or omadacycline
2.3	<i>Corynebacterium</i> spp.	Resistant to vancomycin, teicoplanin, telavancin, dalbavancin, oritavancin, daptomycin, linezolid, tedizolid, quinupristin-dalfopristin or tigecycline
2.4	<i>Streptococcus pneumoniae</i>	Resistant to carbapenems, vancomycin, teicoplanin, telavancin, dalbavancin, oritavancin, daptomycin, linezolid, tedizolid, quinupristin-dalfopristin, tigecycline, eravacycline, omadacycline or rifampicin.
2.5	Group A, B, C and G $\beta$ -haemolytic streptococci	Resistant to penicillin, cephalosporins, vancomycin, teicoplanin, telavancin, dalbavancin, oritavancin, daptomycin, linezolid, tedizolid, quinupristin-dalfopristin, tigecycline, eravacycline or omadacycline
2.6	<i>Enterococcus</i> spp.	Resistant to daptomycin, linezolid, tigecycline, eravacycline or omadacycline Resistant to teicoplanin but not vancomycin
2.7	<i>Enterococcus faecalis</i>	Resistant to ampicillin
2.8	<i>Enterococcus faecalis</i> , <i>Enterococcus gallinarum</i> , <i>Enterococcus casseliflavus</i> , <i>Enterococcus avium</i>	Susceptible to quinupristin-dalfopristin, consider misidentification. If also resistant to ampicillin it is almost certainly <i>E. faecium</i>

<sup>1</sup> Except in countries where linezolid, tedizolid or quinupristin-dalfopristin resistant coagulase-negative staphylococci are not rare.

**Table 3**      **Expected susceptible phenotype (resistance not expected) in anaerobes**

Rule	Organisms	Unusual phenotypes
3.1	<i>Bacteroides</i> spp.	Resistant to metronidazole
3.2	<i>Clostridioides difficile</i>	Resistant to metronidazole, vancomycin or fidaxomicin