

Antimicrobial-Resistant Phenotype Definitions

Analysis of Antimicrobial-Resistant Organisms in NHSN

Updated 2021

This document provides definitions for the pre-defined antimicrobial resistance patterns (phenotypes) that are used in the NHSN analytic reports located in the following analysis folder: [HAI Antimicrobial Resistance \(DA + PA Modules\) > Antimicrobial Resistant HAIs.](#)

Phenotype Name	Phenotype Code	Phenotype Definition
Methicillin-resistant <i>Staphylococcus aureus</i>	MRSA_HAI	<i>Staphylococcus aureus</i> that has tested Resistant (R) to at least 1 of the following: methicillin, oxacillin, or ceftiofur.
Carbapenem-resistant Enterobacteriaceae	CREall_HAI	Any <i>Escherichia coli</i> , <i>Klebsiella aerogenes</i> , <i>Klebsiella oxytoca</i> , <i>Klebsiella pneumoniae</i> , or <i>Enterobacter</i> spp. that has tested Resistant (R) to at least 1 of the following: imipenem, meropenem, doripenem, ertapenem, meropenem/vaborbactam, or imipenem/relebactam. *NOTE: For data prior to 2021, meropenem/vaborbactam and imipenem/relebactam are not included in the CRE definition, as results for these drugs were not collected in NHSN.
Carbapenem-resistant <i>E. coli</i>	CREecoli_HAI	Any <i>Escherichia coli</i> that has tested Resistant (R) to at least 1 of the following: imipenem, meropenem, doripenem, ertapenem, meropenem/vaborbactam, or imipenem/relebactam. *NOTE: For data prior to 2021, meropenem/vaborbactam and imipenem/relebactam are not included in the CRE definition, as results for these drugs were not collected in NHSN.
Carbapenem-resistant <i>Enterobacter</i> spp.	CREenterobacter_HAI	Any <i>Enterobacter</i> spp. that has tested Resistant (R) to at least 1 of the following: imipenem, meropenem, doripenem, ertapenem, meropenem/vaborbactam, or imipenem/relebactam. *NOTE: For data prior to 2021, meropenem/vaborbactam and imipenem/relebactam are not included in the CRE definition, as results for these drugs were not collected in NHSN.
Carbapenem-resistant <i>Klebsiella aerogenes</i> / <i>oxytoca</i> / <i>pneumoniae</i>	CREklebsiella_HAI	Any <i>Klebsiella aerogenes</i> *, <i>Klebsiella oxytoca</i> or <i>Klebsiella pneumoniae</i> that has tested Resistant (R) to at least 1 of the following: imipenem, meropenem, doripenem, ertapenem, meropenem/vaborbactam, or imipenem/relebactam. *NOTE: <i>Klebsiella aerogenes</i> is only counted here for 2020 events and forward. Prior to 2020, this pathogen was referred to as <i>Enterobacter aerogenes</i> , and thus would be counted as CRE Enterobacter. For data prior to 2021, meropenem/vaborbactam and imipenem/relebactam are not included in the CRE definition, as results for these drugs were not collected in NHSN.



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Phenotype Name	Phenotype Code	Phenotype Definition
Extended-spectrum cephalosporin-resistant <i>E. coli</i>	ESCecoli_HAI	Any <i>Escherichia coli</i> that has tested Intermediate (I) or Resistant (R) to at least 1 of the following: cefepime, ceftriaxone, cefotaxime, ceftolozane/tazobactam, or ceftazidime/avibactam. *NOTE: For data prior to 2021, ceftolozane/tazobactam and ceftazidime/avibactam are not included in the ESC definition, as results for these drugs were not collected in NHSN.
Extended-spectrum cephalosporin-resistant <i>Klebsiella oxytoca</i> / <i>pneumoniae</i>	ESCKlebsiella_HAI	Any <i>Klebsiella oxytoca</i> or <i>Klebsiella pneumoniae</i> that has tested Intermediate (I) or Resistant (R) to at least 1 of the following: cefepime, ceftriaxone, cefotaxime, ceftolozane/tazobactam, or ceftazidime/avibactam. *NOTE: For data prior to 2021, ceftolozane/tazobactam and ceftazidime/avibactam are not included in the ESC definition, as results for these drugs were not collected in NHSN.
Carbapenem-non-susceptible <i>Pseudomonas aeruginosa</i>	carbNS_PA_HAI	<i>Pseudomonas aeruginosa</i> that has tested either Intermediate (I) or Resistant (R) to at least 1 of the following: imipenem, meropenem, or doripenem.
Multidrug-resistant <i>Pseudomonas aeruginosa</i>	MDR_PA_HAI	<i>Pseudomonas aeruginosa</i> that has tested either Intermediate (I) or Resistant (R) to at least 1 drug in at least 3 of the following 5 categories: 1. Extended-spectrum cephalosporin (cefepime, ceftolozane/tazobactam, ceftazidime/avibactam) 2. Fluoroquinolones (ciprofloxacin, levofloxacin) 3. Aminoglycosides (amikacin, gentamicin, tobramycin) 4. Carbapenems (imipenem, meropenem, doripenem) 5. Piperacillin/tazobactam *NOTE: For data prior to 2021, ceftolozane/tazobactam and ceftazidime/avibactam are not included in the ESC definition, as results for these drugs were not collected in NHSN. Prior to 2021, piperacillin was grouped with piperacillin/tazobactam.
Carbapenem-non-susceptible <i>Acinetobacter</i> spp.	carbNS_Acine_HAI	Any <i>Acinetobacter</i> spp. that has tested either Intermediate (I) or Resistant (R) to at least 1 of the following: imipenem, meropenem, or doripenem.



Phenotype Name	Phenotype Code	Phenotype Definition
Multidrug-resistant <i>Acinetobacter</i> spp.	MDR_Acine_HAI	<p>Any <i>Acinetobacter</i> spp. that has tested either Intermediate (I) or Resistant (R) to at least 1 drug in at least 3 of the following 6 categories:</p> <ol style="list-style-type: none"> 1. Extended-spectrum cephalosporin (cefepime, ceftazidime, ceftriaxone, cefotaxime) 2. Fluoroquinolones (ciprofloxacin, levofloxacin) 3. Aminoglycosides (amikacin, gentamicin, tobramycin) 4. Carbapenems (imipenem, meropenem, doripenem) 5. Piperacillin/tazobactam 6. Ampicillin/sulbactam <p>*NOTE: For data prior to 2021, ceftriaxone and cefotaxime are not included in the ESC definition, as results for these drugs were not collected in NHSN for <i>Acinetobacter</i>. In addition, for data prior to 2021, piperacillin was grouped with piperacillin/tazobactam.</p>
Vancomycin-resistant <i>Enterococcus faecalis</i>	VREfaecalis_HAI	<i>Enterococcus faecalis</i> that has tested Resistant (R) to vancomycin.
Vancomycin-resistant <i>Enterococcus faecium</i>	VREfaecium_HAI	<i>Enterococcus faecium</i> that has tested Resistant (R) to vancomycin.

