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Carbapenemase Producing Carbapenem-Resistant Enterobacteriaceae (CP-CRE) 2018 Case Definition | CDC  
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National Notifiable Diseases Surveillance System (NNDSS)  
Explore Topics  
Search  
Search  
Clear Input  
For Everyone  
About About National Notifiable Diseases Surveillance System  
What is Case Surveillance?  
Case Surveillance Modernization  
Infectious Disease Tables  
Non-Infectious Disease Data  
Technical Resource Center  
Case Surveillance in Action  
Contact Us  
View all  
Related Topics:  
NDC Application  
View All  
search  
close search  
search  
National Notifiable Diseases Surveillance System (NNDSS)  
Menu  
Close  
search  
For Everyone  
About About National Notifiable Diseases Surveillance System  
What is Case Surveillance?  
Case Surveillance Modernization  
Infectious Disease Tables  
Non-Infectious Disease Data  
Technical Resource Center  
Case Surveillance in Action  
Contact Us  
View All  
Related Topics  
NDC Application  
View All  
National Notifiable Diseases Surveillance System (NNDSS)  
About About National Notifiable Diseases Surveillance System  
What is Case Surveillance?  
Case Surveillance Modernization  
Infectious Disease Tables  
Non-Infectious Disease Data  
Technical Resource Center  
Case Surveillance in Action  
Contact Us  
View All  
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Case Definitions  
Message Mapping Guides  
Supporting Documents for Implementation  
Event Codes & Other Surveillance Resources  
Carbapenemase Producing Carbapenem-Resistant Enterobacteriaceae (CP-CRE)  
2018 Case Definition  
Carbapenemase Producing Carbapenem-Resistant Enterobacteriaceae (CP-CRE)  
2018 Case Definition  
NOTE:  
A surveillance case definition is a set of uniform criteria used to define a disease for public health surveillance. Surveillance case definitions enable public health officials to classify and count cases consistently across reporting jurisdictions. Surveillance case definitions are not intended to be used by healthcare providers for making a clinical diagnosis or determining how to meet an individual patient’s health needs.  
CSTE Position Statement(s)  
17-ID-04  
Subtype(s)  
CP-CRE,  
Enterobacter  
spp.  
CP-CRE,  
Escherichia coli  
(  
E. coli  
)  
CP-CRE,  
Klebsiella  
spp.  
Background  
Carbapenemase Producing Carbapenem-Resistant Enterobacteriaceae (CP-CRE) is defined as  
E. coli  
,  
Klebsiella  
spp., or  
Enterobacter  
spp. where the isolate is:  
Positive for carbapenemase production by a phenotypic method  
-  
OR  
-  
Positive for a known carbapenemase resistance mechanism by a recognized test (see below for included carbapenemases)  
CP-CRE are an emerging and epidemiologically important threat. Since the first detection of CP-CRE in the United States (1), CP-CRE have spread rapidly, with cases reported in all 50 states (2). Infections with CP-CRE are difficult to treat and associated with high mortality rates (3). Carbapenem antibiotics are often used as the last line of treatment for infections caused by highly resistant bacteria, including those in the  
Enterobacteriaceae  
family. Increased antimicrobial resistance limits treatment options (4). CP-CRE contain mobile resistance elements that facilitate transmission of resistance to other Gram negative bacilli (5). Early detection and aggressive implementation of infection prevention and control strategies are necessary to prevent further spread of CP-CRE, especially novel CP-CRE. These strategies require an understanding of the prevalence or incidence of CP-CRE.  
Laboratory Criteria For Diagnosis  
Laboratory evidence of carbapenemase production in an isolate by a phenotypic method or positive for a known carbapenemase resistance mechanism by specific testing methods, such as:  
Phenotypic methods for carbapenemase production:  
Carba NP positive  
Metallo-β-lactamase testing (e.g., E-test) positive  
Modified Carbapenem Inactivation Method (mCIM) positive or indeterminate  
Carbapenem Inactivation Method (CIM) positive  
Modified Hodge Test (MHT) positive  
Positive for phenotypic carbapenemase production (e.g., mCIM, CIM, CarbaNP) but negative by polymerase chain reaction (PCR) (e.g., Xpert Carba-R) for all known resistance mechanisms (e.g.  
Klebsiella pneumoniae  
Carbapenemase [KPC], New Delhi metallo-β-lactamase [NDM], oxacillinase-48 [OXA-48], Verona integron-encoded metallo-β-lactamase [VIM], imipenemase [IMP])  
Molecular methods for resistance mechanism:  
PCR positive (for KPC, NDM, OXA-48, IMP, or VIM)  
Xpert Carba-R positive (for KPC, NDM, OXA-48, VIM, IMP)  
PCR or Xpert Carba-R positive for novel carbapenemase  
Criteria to Distinguish a New Case from an Existing Case  
Different organisms/species/carbapenemases are counted as separate events from other organisms/species/carbapenemases.  
There is at least a 12 month interval from previous notification event for clinical cases.  
A person with a clinical case should not be counted as a screening/surveillance case thereafter (e.g., patient with known infection who later has colonization of GI tract is not counted as more than one case).  
A person with a screening case can be later categorized as a clinical case (e.g., patient with positive peri-rectal screening swab who later develops blood stream infection would be counted in both categories).  
Case Classification  
Confirmed  
E. coli  
,  
Klebsiella  
spp., or  
Enterobacter  
spp. from any isolate that is:  
Positive for known carbapenemase resistance mechanism (e.g., KPC, NDM, VIM, IMP, OXA-48) demonstrated by a recognized test (e.g., PCR, Xpert Carba-R);  
-  
OR  
-  
Positive on a phenotypic test for carbapenemase production (e.g., metallo-β-lactamase test, modified Hodge test, Carba NP, Carbapenem Inactivation Method [CIM], or modified CIM).  
Case Classification Comments  
Cases involving isolates that are phenotypically positive for carbapenemase production (e.g., mCIM), but negative for KPC, NDM, OXA-48, VIM, and IMP should be counted as confirmed CP-CRE. Isolates should be submitted to the regional laboratories of the ARLN for further characterization (potential novel carbapenemase).  
A positive Modified Hodge Test (MHT) can be used to confirm CP-CRE for  
Klebsiella  
spp and  
E. coli  
but not  
Enterobacter  
spp. An isolate that tests positive on MHT but negative PCR for KPC, NDM, OXA-48, VIM and IMP should have additional characterization performed with another phenotypic test for carbapenemase such as mCIM.  
If isolate is indeterminate on mCIM and negative by PCR for KPC, NDM, OXA-48, VIM and IMP, isolate should be tested using CarbaNP (at state public health laboratory or regional ARLN lab).  
CP-CRE should be stratified by the 3 subtypes (genera):  
Klebsiella  
spp,  
Enterobacter  
spp and  
E.coli  
. Each subtype/ genus should be stratified by whether the cultures were clinical (i.e., collected for the purpose of diagnosing or treating disease in the course of normal care) versus for screening/surveillance (i.e., collected for the detection of colonization and not for the purpose of diagnosing or treating disease). Because it can be difficult to differentiate screening cultures from clinical cultures based on microbiology records, screening tests should generally be limited to rectal, peri-rectal or stool cultures. Cultures from such sites can be assumed to be for screening unless specifically noted otherwise. Laboratory may also note screening culture for other sites (e.g., wounds, tracheostomy or central line sites). Laboratories do not need to change their practice; public health wants to identify all CP-CRE whether they come from screening or clinical cultures.  
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Back to Top  
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Twitter  
Syndicate  
Content Source:  
Case Definitions  
Message Mapping Guides  
Supporting Documents for Implementation  
Event Codes & Other Surveillance Resources  
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View All  
About About National Notifiable Diseases Surveillance System  
What is Case Surveillance?  
Case Surveillance Modernization  
Infectious Disease Tables  
Non-Infectious Disease Data  
Technical Resource Center  
Case Surveillance in Action  
Contact Us  
View All  
Sign up for Email Updates  
Contact CDC  
Organization  
Policies  
Web Policies  
Languages  
Languages  
Español  
Language Assistance  
Archive  
CDC Archive  
Public Health Publications  
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Policies  
Web Policies  
Languages  
Languages  
Español  
Language Assistance  
Archive  
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