Health Officer Order for Reporting of Carbapenem-Resistant Enterobacterales (CRE) and Antimicrobial Resistance (AR) of Bacterial Pathogens

Frequently Asked Questions (FAQs)

The following FAQs relate to compliance with the Health Officer Order for Reporting of Carbapenem-Resistant Enterobacterales (CRE) and Antimicrobial Resistance (AR) of Bacterial Pathogens issued on January 19th, 2017. These instructions were updated April 2021.

Updated instructions and FAQs for CRE reporting can be found at:
http://www.publichealth.lacounty.gov/acd/Diseases/CRE.htm

Updated instructions and FAQs for antibiogram reporting can be found at:
http://publichealth.lacounty.gov/acd/antibiogram.htm

Last Updated April 5, 2021

Table of Contents

If you have other questions about reporting, please contact the Acute Communicable Disease Program at 213-240-7941 or hai@ph.lacounty.gov.

Reporting of Carbapenem-Resistant Enterobacterales (CRE)

GENERAL INFORMATION

Why were CRE made reportable?
CRE are a growing public health problem. From 2010-2012, when CR-*Klebsiella pneumoniae* (a type of CRE) was reportable, over 2,000 cases were reported to LACDPH. Since then, reliable epidemiological and clinical information regarding CRE has not been readily available. Thus, LACDPH is increasing its efforts to track and respond to CRE within Los Angeles County (LAC) in order to prevent its spread.

What are carbapenemase-producing CRE (CP-CRE)?
Some CRE produce an enzyme, carbapenemase, that breaks down beta-lactam antibiotics (penicillins, cephalosporins, monobactams, and carbapenems), making the antibiotics ineffective. CP-CRE have the ability to spread rapidly and can cause infections that are difficult to treat and associated with high mortality rates.

What does LACDPH plan to do with CRE information?
LACDPH will use CRE reports to monitor trends, develop guidance and interventions for healthcare facilities, and identify and respond to outbreaks.

Who is required to report CRE?
Acute care hospitals (ACHs,) and skilled nursing facilities (SNFs) are the facilities mandated to report all CRE, please see the "Provider Reporting" section below. Laboratories are required to submit CP-CRE, please see the "Laboratory Reporting" section below.

What is required to be reported?
Reporting of CRE in LAC will follow the Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN) Multidrug-Resistant Organism (MDRO) and *Clostridium difficile* Infection (CDI) Module: report all first CRE-positive tests per patient, per calendar month, per location, regardless of specimen source or organism, that were collected on or after January 1st, 2017. SNFs are to follow the same surveillance rule above and report to the LACDPH Morbidity Unit via fax beginning February 28, 2017; include the lab report with susceptibility results and completed CRE Case Report Form when reporting. Note only clinical specimens are to be reported; do not report tests related to active surveillance.

In addition, effective November 11, 2019, Title 17 LAC DPH Laboratory Reportable Disease list was updated to include CP-CRE per CDPH requirement. Laboratory reporting of CP-CRE will be done via ELR and follow the CDC case definition with no clinical criteria included. Laboratories that do not perform carbapenemase testing should report all CRE as "CP-CRE, Unknown". Antimicrobial susceptibility testing results (MIC values and interpretation) should accompany all reports. Laboratories unable to submit reports electronically may temporarily report on paper until your ELR system is in place.

PROVIDER REPORTING INFORMATION

When should CRE be reported?
CRE events should be reported within 7 days of final laboratory identification. If you are unable to meet the reporting time frame for any reason, an exemption can be granted. Email hai@ph.lacounty.gov to request a reporting time frame exemption.

What is the CRE surveillance definition?
LACDPH will follow the CDC NHSN MDRO and CDI Module CRE surveillance definition, which define CRE as any *Escherichia coli*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Klebsiella aerogenes* or *Enterobacter* spp. demonstrating resistance by one or more of the following methods:

1. Resistant to imipenem, meropenem, doripenem, or ertapenem, meropenem/vaborbactam, or imipenem/relebactam by standard susceptibility testing methods (specifically, minimum inhibitory concentrations of ≥4 mcg/mL for doripenem, imipenem, meropenem, meropenem/vaborbactam, and imipenem/relebactam or ≥2 mcg/mL for ertapenem) **OR**
2. Production of a carbapenemase (e.g., KPC, NDM, VIM, IMP, OXA-48) demonstrated using a recognized testing method (e.g., polymerase chain reaction (PCR), metallo-β-lactamase test , modified carbapenem inactivation method (mCIM), Carba NP, or modified Hodge test (however, the modified Hodge test is no longer a recommended test))

Note that reporting is required if either criteria 1 or 2 above is met.

Should all clinical and surveillance culture results be reported?
Only clinical results should be reported. Tests to detect the presence of CRE in the absence of signs of illness are considered surveillance and are not to be reported.

Should all inpatient and outpatient culture results be reported?
MDRO LabID Event reporting can occur in any location: inpatient or outpatient, however separate denominators must be entered for each location in the facility as specified in the NHSN Monthly Reporting Plan. Results for specimens obtained from inpatients should be reported. Results for specimens collected from emergency departments and 24-hour observation locations should also be reported.

Should both community-onset and healthcare-onset cases be reported?
Yes. All clinical CRE-positive specimens collected at your healthcare facility should be reported, regardless of type of onset.

During the same admission, my patient has multiple positive CRE cultures. Do I report them all?
Only one CRE report should be made per location per calendar month, except in the situations described below. If the patient has two different isolates from two different locations, report both. Note that reporting is by calendar month so that for a patient with an isolate at the end of one month and a second isolate at the beginning of the next month, both would be reported.

During the same month, my patient is found to have CR-*E. coli* and, on a later date, CR-*Klebsiella*. Do I report both?
Yes, you would report both. While the NHSN definition indicates one CRE positive isolate per patient, per month, per location are to be reported, if the organisms isolated are different during the same

calendar month each organism would be reported. Duplicate CRE *E. coli* would not have been reportable, except as described in the next question.

During the same month, my patient is found to be CRE-positive in one body site and is later found to be CRE-positive (same organism) in another body site. Do I report both?
The second isolate should be reported only if the second specimen is a blood specimen. If the second specimen within a calendar month is not a blood specimen, then you would not report the second isolate. No other non-blood isolates should be reported for the month for this patient and location as these would represent duplicate isolates. Any additional positive blood isolates for the month should be reported if collected more than 14 days after the original positive blood isolate. Please use the MDRO LabID Event Calculator to determine if the event needs to reported.

What if the patient is discharged before I get the positive CRE culture report? Who is responsible for reporting then—the laboratory or the healthcare facility?
The facility that orders and obtains the specimen is responsible for reporting the CRE case, regardless of when susceptibility reports arrive.

If a patient is discharged without CRE-positive lab results, and is readmitted two weeks later from another healthcare facility (e.g., rehabilitation center, different hospital, etc.) with CRE, how do I report this?
If the CRE-positive specimen was collected in your healthcare facility, then your facility is responsible for reporting. However, you can indicate either in NHSN or in the CRE Case Report Form that the patient was discharged within the past 4 weeks from another healthcare facility (and include the facility name).

If a healthcare facility reports a CRE-positive patient to LACDPH who is later transferred to another facility (i.e. a nursing home or other hospital), does the facility that the patient was transferred to also need to report the same patient?
No, the facility the patient was transferred to does not need to report the patient. This facility would only report CRE if a specimen for that patient was collected while they were admitted to their facility. LACDPH recommends notifying the facility to which the patient was transferred that they are CRE positive.

If a patient already had a CRE-positive culture during a previous visit, do I have to report the patient again if they test CRE-positive on another admission?
Yes. Report the first CRE- positive culture for each separate patient admission. Thus, if a patient has two separate facility admissions and has a positive CRE culture in each admission (from specimens collected within your facility), both events should be reported even if they occur within the same calendar month.

What is a carbapenemase, and is carbapenemase-producing (CP)-CRE different?
Carbapenemases are enzymes that render the carbapenem class of antibiotics (doripenem, ertapenem, imipenem, and meropenem) ineffective. The genes encoding carbapenemase enzymes are commonly found on mobile gene elements (plasmids) that can transfer between bacteria; thus, organisms that carry carbapenemases, like CP-CRE, are a greater public health threat than non-CP-CRE. The most common carbapenemase genes are KPC, OXA, NDM, VIM and IMP.

How are carbapenemases detected?
There are genotypic and phenotypic methods used to identify carbapenemases. Genotypic methods detect the presence of a specific carbapenemase gene but do not confirm whether the enzyme is active.

These methods utilize polymerase chain reaction (PCR). Phenotypic methods detect the activity of a carbapenemase enzyme, but do not specify which gene is present. These methods include the modified carbapenem inactivation method (mCIM), Carba NP, or modified Hodge test (however, the modified Hodge test is not a recommended test).

What if my laboratory does not perform carbapenemase testing?
Carbapenemase testing is not required of clinical laboratories at this time. However, because LA County has a high prevalence of CRE, we suggest you consider implementing some method to detect carbapenemases amongst patients in your healthcare facility. A relatively simple and efficient test is the modified carbapenem inactivation method (mCIM).

If I do not have an on-site laboratory (i.e., I use a reference laboratory), who is responsible for reporting a CRE-positive patient to LACDPH? Should both the lab and my facility report?
Both the facility and laboratory are now responsible for reporting. CRE identified by standard MIC testing and CP-CRE as outlined in the LAC DPH Health Officer Order should be reported to LAC DPH.

CP-CRE or CP-CRE Unknown (if carbapenemase testing is not performed) is a laboratory reportable condition and should be reported via ELR. For laboratories who do not utilize ELR, a CMR and final lab result should be faxed to Morbidity.

What if an isolate meets the susceptibility criterion, but carbapenemase testing is negative?
If an isolate meets either of the two surveillance criteria, it should be reported.

LABORATORY REPORTING INFORMATION

When should CRE (includes CP-CRE and CP-CRE, Unknown) be reported?
CP-CRE events should be reported within 1 day of final laboratory identification.

What is the laboratory CP-CRE surveillance definition?
CDPH's laboratory reportable CP-CRE requirement will follow the CDC case definition for Carbapenemase Producing Carbapenem-Resistant Enterobacterales (CP-CRE) defined as *E. coli*, *Klebsiella* spp., or *Enterobacter* spp. from any isolate that is:

1. 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**
2. 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).

How do I know if a CRE isolate is CP if my laboratory does not perform carbapenemase testing?
If an isolate is identified as CRE by standard MIC testing but your lab does not perform carbapenemase testing, you should report the isolate as "CP-CRE Unknown", since CP status is unknown.

Does the laboratory have to report CP-CRE and CP-CRE, unknown cases to LACDPH?
Yes. For CP-CRE as defined above, a laboratory that performs carbapenemase testing should submit data for CP-CRE positive cases via ELR (Electronic Laboratory Reporting).

Similarly, a laboratory that does not perform carbapenemase testing should submit data for CP-CRE, unknown.

Laboratories that do not utilize ELR should fax a final lab report (including all AST) with a completed CMR to LAC DPH Morbidity Unit at (888) 397-3778.

A laboratory is not required to report CRE that test negative for carbapenemase by a phenotypic or molecular method. However, the provider is required to report results to LACDPH of all CRE isolates (CP-CRE; CP-CRE, unknown; and CRE negative for CP) as described in the provider reporting section above.

USING NHSN TO SUBMIT CASE INFORMATION

When should facilities use the National Healthcare Safety Network (NHSN) to submit cases?
All LAC ACHs are required to use NHSN to submit CRE-positive results. All SNFs that are enrolled in NHSN are also required to submit CRE results via NHSN. If a SNF is not currently enrolled in NHSN, they may fax reports to the LACDPH Morbidity Unit at (888) 397-3778 and include the laboratory report with susceptibility results and the CRE Case Report Form. For SNFs interested in enrolling in NHSN please contact us at hai@ph.lacounty.gov and we can provide guidance as you complete the enrollment process.

What if I need to report for more than one facility?
Please report cases under the appropriate facility name/ID in NHSN.

Can I enter information into NHSN about a patient who was found to be CRE-positive even if the culture was collected before January 1st, 2017?
For CRE cultures collected prior to January 1, 2017, reporting via NHSN is optional and at the discretion of the reporting facility. For SNFs not reporting in NHSN the start date is February 28, 2017.

What if I had zero CRE cases in any given month/year?
You must indicate in your NHSN monthly summary data entry that you did not have any CRE-positive cultures for any given month of the reporting period by checking the "Report No Events" box next to the individual CRE organism for which you are reporting no events.

For more information and/or scenarios pertaining to reporting CRE in the NHSN LabID Module, please visit:
ACHs: https://www.cdc.gov/nhsn/acute-care-hospital/cdiff-mrsa/
LTACHs: https://www.cdc.gov/nhsn/ltach/cdiff-mrsa/index.html
SNFs: https://www.cdc.gov/nhsn/ltc/cdiff-mrsa/index.html

USING THE CRE CASE REPORT FORM TO SUBMIT CASE INFORMATION

When should facilities use the CRE Case Report Form to submit cases?
Only SNFs that are not enrolled in NHSN should be reporting CRE via this form.

Who is responsible for filling out the form?
We ask that your facility's designated infection preventionist fill out this form, with the assistance of clinical and/or laboratory staff as needed.

Reporting of Annual Antibiogram

GENERAL INFORMATION

Why were antibiograms made reportable?
CRE is only one of many types of antimicrobial resistant (AR) organisms that are circulating in healthcare facilities. Antibiograms provide a comprehensive summary about AR organisms within healthcare facilities. Tracking the rise and spread of AR organisms will allow LACDPH to better understand the problem of AR, and better target interventions and prevention activities.

What does LACDPH plan to do with antibiogram information?
By tracking resistance rates across LA County, LACDPH will be able to rapidly and efficiently identify areas needing public health intervention in order to prevent the further spread of AR organisms. LACDPH will also use these data to compile an aggregate LA County antibiogram that will be made available to healthcare facilities so they can compare their resistance trends to the county overall.

What is required to be reported?
All ACHs and some SNFs prepare a facility-level antibiogram on at least an annual basis. The annual antibiogram data encompassing one calendar year (January – December) is what LACDPH is requiring to be reported. LACDPH also requires that healthcare facilities follow the most current Clinical & Laboratory Standards Institute (CLSI) guidelines to prepare their antibiogram.

PREPARING AN ANTIBIOGRAM

Where can I find the most current Clinical & Laboratory Standards Institute (CLSI) guidelines to meet the antibiogram preparation requirements?
You can visit our Antibiogram page for resources http://ph.lacounty.gov/acd/antibiogram.htm. The M39-A4 outlines the analysis and presentation of cumulative antibiograms. The CLSI M100-30th ed outlines standards for antimicrobial susceptibility testing. These guidelines can be found at http://clsi.org/standards/

Which organisms should be included?
Follow the most current CLSI guidelines. Currently, the M39-A4 guidelines state facilities should only include species with ≥ (greater than or equal to) 30 diagnostic (not surveillance) isolates per year. However, LACDPH is requesting all species be included (regardless of total number of isolates), and to include the number of isolates tested per organism.
The organisms of interest to LACDPH include:

- ***Enterobacterales* group:** *Escherichia coli, Enterobacter cloacae* complex, *Enterobacter* spp. (*Enterobacter* isolates not identified to species or *Enterobacter* species other than *cloacae* complex)*, Klebsiella aerogenes, Klebsiella oxytoca, Klebsiella pneumoniae, Proteus mirabilis, Serratia marcescens, Citrobacter freundii, Citrobacter koseri, Morganella morganii*
- **Non-*Enterobacterales* group:** *Pseudomonas aeruginosa, Acinetobacter baumannii, Stenotrophomonas maltophilia*
- **Gram-positive pathogens:** Methicillin-resistant *Staphylococcus aureus,* Methicillin-susceptible *Staphylococcus aureus*, all *Staphylococcus aureus, Streptococcus pneumoniae, Streptococcus pyogenes (*Group A *Streptococcus), Streptococcus agalactiae* (Group B *Streptococcus*), *Streptococcus pneumoniae* (separated by meningitis and non-meningitis breakpoints for select agents), *Enterococcus faecalis*, *Enterococcus faecium, Enterococcus* spp. (include from *E.*

faecalis, E. faecium, other *Enterococcus* spp. and enterococci not identified to species level combined*).*

Which antimicrobials should be included?
Follow the most current CLSI guidelines. Currently, the M39-A4 guidelines state facilities should only include drugs that are routinely tested by your microbiology lab. Please work with your microbiologist to understand what drugs are routinely tested and reported for providers in your facility.
The antimicrobials of interest to LACDPH include:

- **Antimicrobial susceptibility for gram-negative pathogens:** ampicillin-sulbactam, cefazolin, piperacillin-tazobactam, ceftriaxone, ceftazidime, cefepime, meropenem, ertapenem, imipenem, doripenem, gentamicin, tobramycin, amikacin, ciprofloxacin, levofloxacin, nitrofurantoin, trimethoprim-sulfamethoxazole and minocycline.
- **Antimicrobial susceptibility for gram-positive pathogens:** penicillin*,* ampicillin, oxacillin, ceftriaxone, ceftaroline, doxycycline, levofloxacin, ciprofloxacin*,* linezolid, trimethoprim-sulfamethoxazole, clindamycin, erythromycin, vancomycin, daptomycin and nitrofurantoin.

What type of results do I include?
Follow the most current CLSI guidelines. Currently, the M39-A4 guidelines state facilities should only include final, verified results for the first isolate per patient per year (regardless of body site, location and of overall antimicrobial susceptibility profile).

SUBMITTING YOUR ANTIBIOGRAM

When are antibiograms due?
As most facilities complete their annual antibiogram within the first few months of the following year, LACDPH requires healthcare facilities to submit their annual antibiogram by June 1st of the following year. For example, the due date for 2020 antibiograms is June 1, 2021.

How do I submit my antibiogram?
Antibiograms are to be submitted using the LACDPH electronic antibiogram submission form (Excel spreadsheet) found at http://publichealth.lacounty.gov/acd/antibiogram.htm. LACDPH will no longer be accepting PDF or Word documents. Antibiogram data must be submitted in the format presented in the Excel submission form.

What if the laboratory I am working with is not aware of or trained to complete the required reporting?
Please direct your laboratory to our ACDC Antibiogram webpage http://ph.lacounty.gov/acd/antibiogram.htm to learn more about how they can meet the requirements.

Which staff member within a healthcare facility is most suited to prepare and submit the facility antibiogram?
The laboratory microbiology staff are generally the most familiar with preparing and analyzing an antibiogram; however, this is not always the case. LACDPH recommends each healthcare facility to assign responsibility of submitting antibiograms annually, and to work with reference/clinical labs and information technology (IT) staff as needed.

What if I need to report for more than one facility?

Please ask your laboratory to separate antibiogram information for each reporting facility and complete a separate antibiogram form for each facility and submit to LACDPH.

What if my facility does not currently create an annual antibiogram?
We recommend that you ask your clinical laboratory if they might be able to generate (or help you generate) a facility-level annual antibiogram for you. SNFs that currently do not have an antibiogram generated by their reference labs are exempt from this requirement. However, as reference laboratories begin to acquire the capability to create facility-specific antibiograms, particularly for antimicrobial stewardship efforts, the most current antibiogram is to be submitted to LACDPH.