

QUARTERLY MDRO UPDATE #13

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC HEALTH
7/31/23

HIGHLIGHTED IN THIS ISSUE

Carbapenemase-producing
Acinetobacter baumannii

SUMMARY

Vigilance in detection and containment of antimicrobial resistance is essential. LACDPH continues to work closely with healthcare partners to meet current AR challenges. Communication of the most up to date developments is key to successfully meeting these challenges.

KEY RESOURCES

[LA County Antibiogram Home Page](#)

[LA County N-MDRO Home Page](#)

[LA County Reportable Disease List](#)

[CDC MDR Data](#)

[CDC Urgent AR Threats Report \(2019\)](#)

[CDC HAI Lab Resources Home Page](#)

Acronyms: AR = Antibiotic Resistance; CDC = Centers for Disease Control and Prevention; HAI = Healthcare-associated Infections; LA = Los Angeles; MDR = Multidrug Resistance; N-MDRO = Novel Multidrug Resistant Organisms.

Note: When calling 213-240-7941 to report MDROs (which is currently routed to a COVID-19 Call Center), please state that you are calling to report an MDRO to the Acute Communicable Disease Control (ACDC) Program.

MESSAGE FOR CLINICAL LABORATORIES

The following topics that are currently of note in Los Angeles County (LAC) will be addressed:

1. Update on multi-drug resistant organisms (MDROs) in LAC
2. NDM-producing carbapenem-resistant *Acinetobacter baumannii* (NDM-CRAB)
3. CRAB Case Study
4. More resources for testing for carbapenemases
5. Update on *Candida auris* in LAC

UPDATE ON PUBLIC HEALTH LABORATORY TESTING AND REMINDER TO REPORT

In the past few months, the LAC Public Health Laboratory (LAC PHL) has resumed testing of carbapenem-resistant organisms (CRO) that are voluntarily submitted by many LAC laboratories. We would like to thank you for your assistance with this initiative. If you are not participating and wish to do so, please contact hai@ph.lacounty.gov. This program is especially valuable for laboratories that do not conduct carbapenemase testing.

The program includes voluntary submission of select isolates:

- Carbapenem-resistant Enterobacterales, *Pseudomonas aeruginosa*, *Acinetobacter* spp.

Note: These are not laboratory reportable unless a carbapenemase test is positive or pan-resistant

The voluntary program differs from **Required Reporting** of carbapenemase-producing organisms (CPO) and carbapenemase genes detected with surveillance (screening) swabs as noted here <http://publichealth.lacounty.gov/acd/docs/LabList.pdf>

We welcome feedback on this Newsletter, previous Newsletters or any other issue related to MDROs (mail hai@ph.lacounty.gov). Note all previous Newsletters are now listed on the last page.

**QUESTIONS? CONTACT THE LACDPH HEALTHCARE OUTREACH UNIT AT
HAI@PH.LACOUNTY.GOV OR 213-240-7941**

UPDATE ON NDM-PRODUCING *ACINETOBACTER BAUMANNII* (NDM-CRAB)

LACDPH identified the first case of NDM-producing carbapenem-resistant *Acinetobacter baumannii* (CRAB) in Los Angeles County when a hospital laboratory performed carbapenemase testing on a wound isolate in January 2023. This laboratory's protocol is to routinely test all CRAB isolates from inpatients for the five main carbapenemases using a commercial molecular test. Since then, a second case of NDM-CRAB was identified in July 2023 from a wound isolate. This hospital's protocol is to collect wound swabs as part of their hospital-acquired pressure injury (HAPI) prevention protocol, and their lab routinely tests all CRO isolates for the main five carbapenemases using a commercial molecular test. Most recently, a third case was identified in July 2023. This isolate from a respiratory specimen submitted to the LACDPH Public Health Laboratories (PHL) as part the voluntary CPO Surveillance Project (see information in box on first page) and was tested using a commercial molecular test.

In 2021, CDPH described a prolonged, multi-facility regional outbreak of NDM-CRAB in Northern California in a [Health Alert](#). Key facts from the outbreak include:

- 52% of NDM-CRAB isolates were pan-non-susceptible (pan-NS)
- 59% of cases were identified via rectal swab (mostly via active surveillance screening)
- Among the 41% of cases that were identified via a diagnostic specimen, sources included:
 - 34% respiratory
 - 26% wound
 - 24% urine

The June 2021 edition of this Newsletter ([#6](#)) described how it may be more difficult to develop a strategy for detecting carbapenemase-producing (CP)-*A. baumannii* as compared to CP-Enterobacterales and CP-*Pseudomonas aeruginosa*.

The recommendations for clinical laboratories for detecting and reporting carbapenemase production in CRAB have not changed and include:

1. Consider performing AST on all *A. baumannii* isolates, especially from high-risk patients (see #2 below), even when isolated from a culture that suggests colonization. For example, performing AST on a few colonies of a gram-negative rod confirmed as *A. baumannii* from a mixed sputum or wound culture. This can aid in putting patients on proper isolation.
2. Perform carbapenemase testing using an [appropriate method](#) on CRAB isolates from high-risk patients that are resistant (R) to all drugs on your panel (pan-resistant). High-risk patients are defined as:
 - Recent admission from any long-term acute care hospital (LTACH) or ventilator-equipped SNF (vSNF)
 - Recent international healthcare exposure
 - High-risk contact of a known CP-CRAB case (these include patients in adjacent rooms that share a bathroom, discharges from facilities with ongoing transmission, or patients who share medical equipment or primary healthcare personnel)

Note: If you do not perform carbapenemase testing for CRAB, the LAC PHL may be able to provide carbapenemase testing for select isolates (in particular, those that are pan-resistant/ R to all antimicrobials tested). Please always email the Healthcare Outreach Unit at hai@ph.lacounty.gov to confirm if an isolate meets criteria before sending anything to the PHL.
3. Communicate results of CRAB isolates, especially CP-CRAB and pan-resistant CRAB, to Infection Preventionists as quickly as possible.
4. Maintain ability to test agents beyond those on your routine test panel (in house or refer out), when requested.
5. Report CP-CRAB and pan-resistant CRAB results to LAC Public Health (see instructions in box on first page).

**QUESTIONS? CONTACT THE LACDPH HEALTHCARE OUTREACH UNIT AT
[HAI@PH.LACOUNTY.GOV](mailto:hai@ph.lacounty.gov) OR 213-240-7941**

Additional Guidance for CP-CRAB can be found here:

1. Carbapenemase testing primer
https://www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/CRO_PrimerTests_for_Carbapenemases.pdf
2. NDM CRAB Transfer Recommendations and FAQs: http://publichealth.lacounty.gov/acd/docs/LACDPH_NDM-CRAB_FAQsforHCFs.pdf

MDRO CASE STUDY: CRAB

Acronyms:

CRAB – [carbapenem-resistant *Acinetobacter baumannii*](#)

CP-CRAB – carbapenemase-producing carbapenem-resistant *Acinetobacter baumannii*

Objectives:

After reviewing this case, you will be able to:

1. Discuss when carbapenemase testing might be considered for CRAB
2. List reliable methods for testing for carbapenemase production in CRAB
3. Describe how to report CP-CRAB results to providers and other stakeholders.

Why this case?

CP-CRAB are being recognized with increasing frequency in LAC and globally. There are few treatment options for CP-CRAB and identification of patients harboring CP-CRAB requires significant infection prevention and public health intervention. CP-CRAB may be difficult to identify because:

- Commonly used phenotypic tests such as mCIM and CarbaNP are unreliable for CRAB.
- Some commercial carbapenemase tests have not been FDA cleared for testing CRAB.

Many CP-CRAB produce OXA-23-like carbapenemases that are less concerning from an epidemiological perspective than KPC, NDM, VIM, IMP and OXA-48 enzymes. “OXA-23-like” carbapenemases are generally not covered in commercial carbapenemase tests.

Patient History:

54-year-old female. Admitting diagnosis: exacerbation of chronic obstructive pulmonary disease (COPD).

Patient had several hospital admissions over the past year. During these hospitalizations, potential pathogens isolated from lower respiratory cultures included *Haemophilus influenzae*, carbapenem-susceptible *Pseudomonas aeruginosa* and MSSA.

For the current admission, a sputum culture taken on day 2 grew many normal respiratory flora and a few colonies of gram-negative rods (GNR). The GNR were not identified because “few GNR” are not considered significant in a sputum specimen that contains many normal respiratory flora.

Bronchial alveolar lavage (BAL) taken on day 6 grew pure culture of *A. baumannii* as shown below:

BAL Report Day 0

Gram stain:
Few WBCs
Few GNR

BAL Report Day 1 - Preliminary

Moderate *Acinetobacter baumannii*

**QUESTIONS? CONTACT THE LACDPH HEALTHCARE OUTREACH UNIT AT
HAI@PH.LACOUNTY.GOV OR 213-240-7941**

BAL Report Day 2 - Final

Moderate *Acinetobacter baumannii*

Antimicrobial Agent	MIC (µg/mL)
Amikacin	>32 R
Ampicillin-sulbactam	>32 R
Cefepime	>16 R
Ceftazidime	>32 R
Ciprofloxacin	>4 R
Gentamicin	>16 R
Meropenem	>8 R
Minocycline	>8 R
Piperacillin-tazobactam	>128/4 R
Tobramycin	>16 R
Trimethoprim-Sulfamethoxazole	>4/78 R

Report Comment:

MDRO (carbapenem-resistant *Acinetobacter baumannii*) isolated. Please place patient in contact precautions. Infectious Diseases consult suggested.

Additional Testing Requested:

Once susceptibility results were reported, the physician requested the isolate be tested against cefiderocol and colistin and for carbapenemase production because: 1) the patient's condition was deteriorating and 2) *A. baumannii* producing NDM was previously isolated from a patient at this facility.

Additional Testing Results:

Cefiderocol = 1 µg/ml Susceptible (performed at a [reference laboratory](#))

Colistin >2 µg/ml Resistant (performed at a reference laboratory)

Carbapenemase testing = negative for KPC, NDM, VIM, IMP, OXA-48 (performed using a [commercial test that is FDA cleared for *A. baumannii*](#))

Public health follow-up will depend on the carbapenemase result:

- Carbapenemase negative: no further investigation
- Carbapenemase positive for a carbapenemase other than OXA-23-like: DPH will perform an investigation. Additional testing, such as whole genome sequencing, may be requested to determine if the specific isolate may possess a novel carbapenemase gene and/or is linked to other isolates in the facility.

Note: laboratories are not required to report CRAB to LAC DPH unless the isolate is positive for carbapenemase production and/or is pan-resistant.

Summary – Key facts about CRAB

- Many CRAB are carbapenem resistant due to production of class D carbapenemases, specifically OXA enzymes.
- OXA carbapenemases are diverse. They are separated into groups and there can be many variants within each group. The “OXA-23-like” group is the most common group conferring carbapenem resistance in CRAB and contains 19 variants (e.g., OXA-23, OXA-27, OXA-49, etc). Individual patients harboring CRAB with OXA-23-like genes only are generally not followed up by DPH.
- Only 2.2% of CRAB in the USA have been [reported by CDC](#) to harbor KPC, NDM, VIM, IMP or OXA-48. Since there are currently no reliable phenotypic tests for carbapenemase production in CRAB and the prevalence of the “big five” carbapenemases is low, development of a practical strategy for identifying CP-CRAB is challenging.

**QUESTIONS? CONTACT THE LACDPH HEALTHCARE OUTREACH UNIT AT
HAI@PH.LACOUNTY.GOV OR 213-240-7941**

- Newer β -lactam combination agents including ceftazidime-avibactam, ceftolozane-tazobactam, imipenem-relebactam and meropenem-vaborbactam are not effective against CRAB.
- Testing of last resort agents such as cefiderocol may be requested from infectious diseases specialists. The Infectious Diseases Society of America has [specific guidelines for treatment of CRAB](#), which often involves combination therapy.
- Due to the difficulties in controlling CRAB and treating CRAB infections, many investigators are continuously exploring [management options](#), including use of [sulbactam-durlobactam](#), an antimicrobial agent that was recently FDA approved.
- Current guidelines for AST of *A. baumannii* including important reporting comments for cefiderocol are provided in [CLSI M100 33rd addition](#).

Important AST Reporting Rule for All Carbapenem-resistant Organisms:
Do not report an isolate as **carbapenemase positive** or **carbapenemase producing** unless a phenotypic or genotypic carbapenemase test is performed and is positive.

New Resource for Updating CLSI Breakpoints

If you are not yet using the current CLSI carbapenem breakpoints, a new tool for updating carbapenem and other breakpoints is available [here](#).

RESOURCES FOR CARBAPENEMASE TESTING

Here are some additional resources for carbapenemase testing:

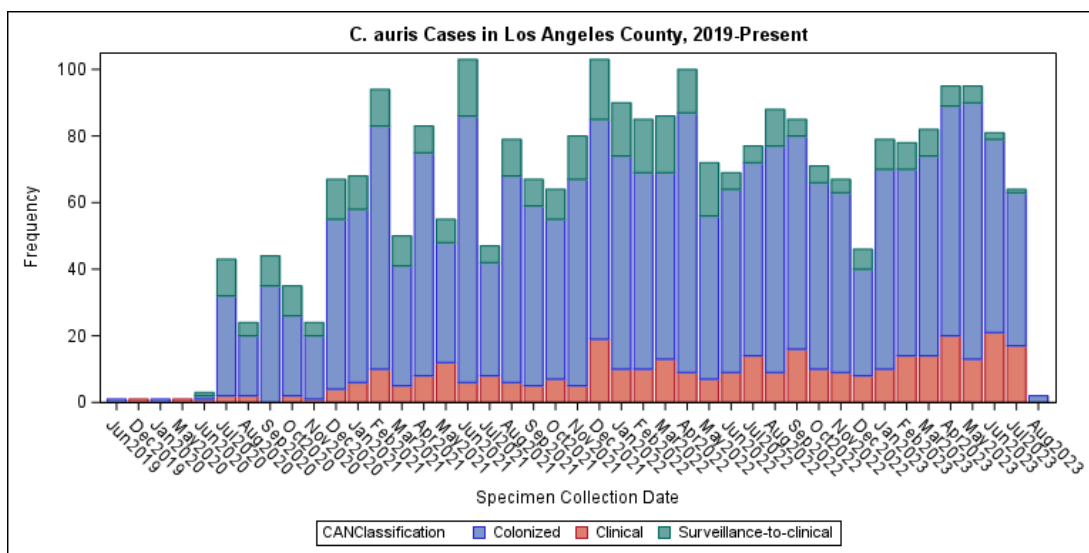
- List of laboratories offering carbapenemase testing services:
<http://publichealth.lacounty.gov/acd/docs/LaboratorieswithCPOScreening.pdf>
- Carbapenemase testing primer
https://www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/CRO_PrimerTests_for_Carbapenemases.pdf
- LACDPH CPO website: <http://publichealth.lacounty.gov/acd/Diseases/CPO.htm>

**QUESTIONS? CONTACT THE LACDPH HEALTHCARE OUTREACH UNIT AT
HAI@PH.LACOUNTY.GOV OR 213-240-7941**

UPDATE ON *C. AURIS* CASES IN LOS ANGELES COUNTY (UPDATED 7/6/2023)

HCF Type	Clinical [^]	Surveillance-to-clinical [†]	Surveillance [*]	Total
General Acute Care Hospital (GACH)	226	52	342	620
Long Term Acute Care Hospital (LTACH)	96	259	1507	1862
Skilled Nursing Facility (SNF)	3	12	76	91
Other	2	0	1	3
Total	327	323	1926	2576
HCF Type	Clinical [^]	Surveillance-to-clinical [†]	Surveillance [*]	Total
General Acute Care Hospital (GACH)	187	33	256	476
Long Term Acute Care Hospital (LTACH)	78	182	1480	1740
Skilled Nursing Facility (SNF)	4	8	76	88
Other	9	0	3	12
Total	278	223	1815	2316

Note that all cases are counted by case and facility type at time of first positive specimen collection. * Swab collected for the purpose of screening for *C. auris* colonization. [^] Specimen collected for clinical purposes. [†] Cases who were first identified via screening swab and later had one or more positive clinical specimen(s).



If your laboratory is unable to perform *C. auris* screening on-site, or needs additional information about testing for *C. auris*, here are a few additional resources:

- List of laboratories that offer *C. auris* colonization screening services: http://publichealth.lacounty.gov/acd/docs/List_C.aurisLabs.pdf
- *C. auris* FAQ for laboratorians at the bench: http://publichealth.lacounty.gov/acd/docs/C.auris_FAQs.pdf
- On demand webinar (recorded in 2022) that summarizes *C. auris* testing strategies in several LAC clinical laboratories: https://www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/CDPH_HAIProgram_LAPH_C-aurisWebinar_051922_ADA.pdf
- On demand webinar (recorded in 2022) that addresses *C. auris* testing, surveillance, and reporting: https://www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/C_auris_ReportingSurveillanceWebinar_110922.pdf

QUESTIONS? CONTACT THE LACDPH HEALTHCARE OUTREACH UNIT AT HAI@PH.LACOUNTY.GOV OR 213-240-7941

PAST NEWSLETTER CONTENTS

Links for all lab newsletters are available on our novel MDRO (NMDRO) website, along with other resources:
<http://publichealth.lacounty.gov/acd/Diseases/NMDRO.htm>

LAC DPH MDRO Lab Newsletters (January 2021 to July 2023) –Featured Contents¹

Topic	Description	Issue #
Organisms		
<i>Acinetobacter baumannii</i>	NDM Outbreak in CA	6
<i>Candida auris</i>	Identification and reporting	1
<i>Candida auris</i>	Antifungal susceptibility testing	2, 11
<i>Candida auris</i>	Validating MALDI-TOF	2
<i>Candida auris</i>	Containment – team approach	3
<i>Candida auris</i>	Passive surveillance	4
<i>Candida auris</i>	Update	7
<i>Candida auris</i>	Numbers in LAC	Summary in every issue
<i>Pseudomonas aeruginosa</i>	Carbapenem resistance	8
<i>Pseudomonas aeruginosa</i>	VIM-CRPA in LAC	11
<i>Pseudomonas aeruginosa</i>	Case Study, carbapenem resistance	12
General		
Antibiotic Resistance Laboratory Network (AR Lab Network)	ARLN purpose and resources	3
Carbapenem resistance	Overview of CRO	9
Carbapenem resistance, reporting and voluntary submission of isolates	Requirements in LAC	12
Carbapenemase-producing organisms	Update on CP-CRO in LAC	11
Carbapenemases	Testing methods	6
MDRO	Definitions	5
Multifacility antibiogram	LAC antibiogram and antibiogram dashboard	10
Surveillance vs diagnostic specimens	Overview of surveillance testing	12

CRO, carbapenem-resistant organisms

CP, carbapenemase-producing

CRPA, carbapenem-resistant *P. aeruginosa*

LAC, Los Angeles County; DPH, Department of Public Health

¹ Newsletter inaugural issue was January 2021

**QUESTIONS? CONTACT THE LACDPH HEALTHCARE OUTREACH UNIT AT
HAI@PH.LACOUNTY.GOV OR 213-240-7941**