

Novel Multi-Drug Resistant Organism (N-MDRO) Response in Los Angeles County

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The first 2 years of surveillance
(2017-2018)

Introduction

Antibiotic resistance continues to be a public health issue as antibiotics are becoming ineffective and the development of new antibiotics are not keeping pace with the growing resistance. Described as “nightmare bacteria”, hard-to-treat bacteria have infected thousands of Americans and result in considerable mortality.¹ As public health departments and hospitals nationwide become more aggressive in coordinating their response to these novel multi-drug resistant organisms (N-MDROs), these superbugs are also constantly developing and spreading through uncommon and emerging resistance genes.

In 2015, the Los Angeles County (LAC) Department of Public Health (DPH) Acute Communicable Disease Control (ACDC) Program initiated a laboratory surveillance project to determine the prevalence of the following carbapenemase genes (plasmid-mediated resistance genes that confer resistance to carbapenems) among carbapenem-resistant Enterobacteriaceae (CRE) in LAC: *Klebsiella pneumoniae* carbapenemase (KPC), Verona Imipenem Metallo-B-lactamase (VIM), New Delhi Metallo-B-lactamase (NDM), Imipenem Metallo-B-lactamase (IMP), OXA-48 like enzymes (OXA). Our surveillance showed that almost all CRE in LAC carried KPC (96%) but a few other mechanisms, which originate in other countries, were found as well.² In conjunction with the Centers for Disease Control and Prevention guidance on how public health can detect and respond to N-MDROs, LAC DPH launched its novel MDRO response in 2017 to detect and contain novel MDROs in LA County.

In October 2018, ACDC released the “Novel MDROs In LA County” flyer to define novel MDROs for LA County and how to report them (Table 1).

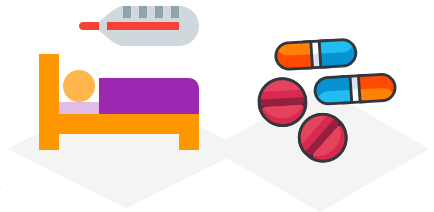


Table 1: Reportable N-MDRO’s in LAC.

Contact ACDC at 213-240-7941 <u>within 1 working day</u> if your facility detects organisms meeting any criteria from any specimen source:			
Targeted MDRO	Organism(s)	Phenotypic Criteria	Genotypic Criteria
Rare carbapenemase-producing organisms	Carbapenem-resistant (CR)- Enterobacteriaceae	Positive mCIM and eCIM test and/or resistance to one or more new agents *	VIM, NDM, IMP, and/or OXA
	CR- <i>Pseudomonas</i> spp.	Positive mCIM test and/or resistance to one or more new agents *	KPC, VIM, NDM, IMP, and/or OXA
	CR- <i>Acinetobacter</i> spp.	N/A	KPC, VIM, NDM, IMP, and/or OXA
<i>mcr</i> -producing organisms	Enterobacteriaceae (excluding <i>Proteus</i> , <i>Providencia</i> , <i>Morganella</i> and <i>Serratia</i>)	Colistin MIC ≥ 4 $\mu\text{g/ml}$	<i>mcr</i>
Vancomycin-intermediate or resistant <i>S. aureus</i> (VISA/ VRSA)	<i>Staphylococcus aureus</i>	Vancomycin MIC ≥ 4 $\mu\text{g/ml}$	N/A
Suspect pan-resistant organisms	Enterobacteriaceae, <i>Pseudomonas</i> spp., or <i>Acinetobacter</i> spp.	Resistant to all drugs tested on your gram-negative panel(s) †	N/A
<i>Candida auris</i>	<i>C. auris</i> can be misidentified when using traditional methods for yeast identification. ‡ Report <i>C. haemulonii</i> as a suspect case.	N/A	N/A

Increased awareness of N-MDROs is needed to increase the response and containment within healthcare facilities.

This issue will describe major findings from the first 2 years of the N-MDRO response as well as provide next steps and resources.

Detection and Containment Methods

When an N-MDRO is identified, LAC DPH works with infection preventionists at the healthcare facility to assess infection control practices, determine need for screening of epidemiologically linked contacts, obtain clinical and epidemiological case information, and provide education. Healthcare facility staff and patients are interviewed to collect additional epidemiological information and on-site investigations are conducted for high-risk settings or if transmission is identified. LAC DPH Public Health Laboratory tests isolates via MALDI-TOF to confirm the identification of the organism and Nanosphere BC-GN to identify the genetic resistance mechanism.



Highlights of findings

Since 2015, LAC DPH has identified 55 cases of N-MDROs. 53 were carbapenemase-producing and 2 were MCR-producing organisms in LAC (Table 2).

Table 2: N-MDRO Cases in LAC DPH 2017-2018 (N=55).

Majority of the N-MDRO cases from 2017 to 2018 were OXA- and NDM- producing organisms.

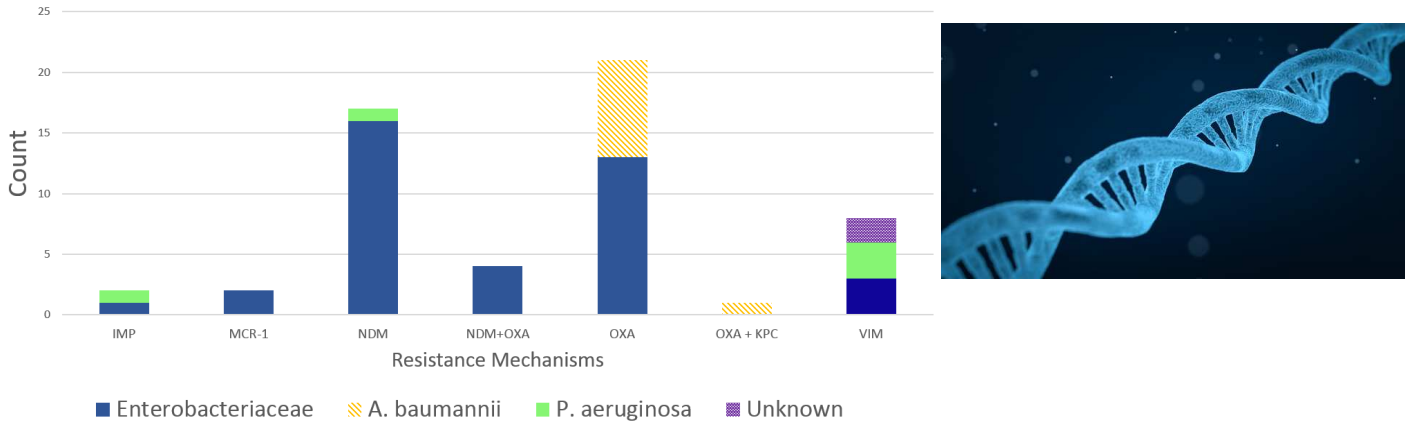


Figure 1. Demographics & Descriptive Characteristics (N=55):

Figure 1A: Gender.

There were 35 (64%) male and 20 (36%) female patients.



Figure 1B: Age group (years).

The median patient age was 63 years (range: 6-94 years).

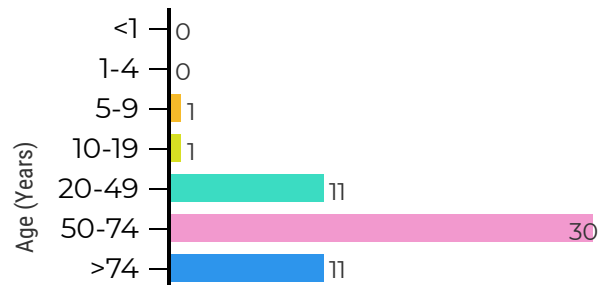


Figure 1C: Reporting Facilities.

Majority of reports were received from acute care hospitals (ACHs). There were some reported from skilled nursing facilities (SNFs) and outpatient clinics (OUTPAT).

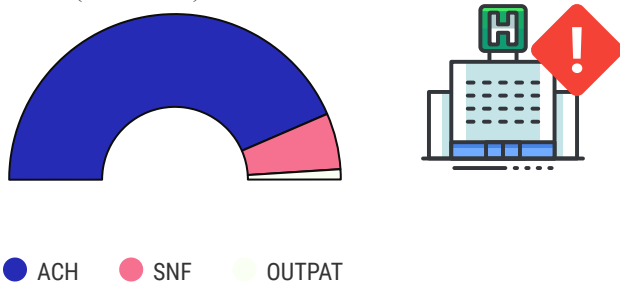


Figure 1D: High risk cases.

High-risk cases were defined as any of the following: assistance for activities of daily living, ventilator-dependent, incontinent, wounds with unmanageable drainage, or unable to maintain hygiene.

67%
of N-MDRO cases
were considered "High Risk" patients

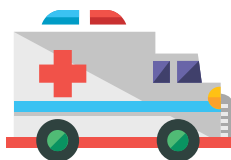


Figure 1E: High-risk setting.

High risk settings for N-MDRO transmission are SNFs or long-term acute care hospitals (LTACs). (6 months prior to culture collection date).

53%
of N-MDRO cases

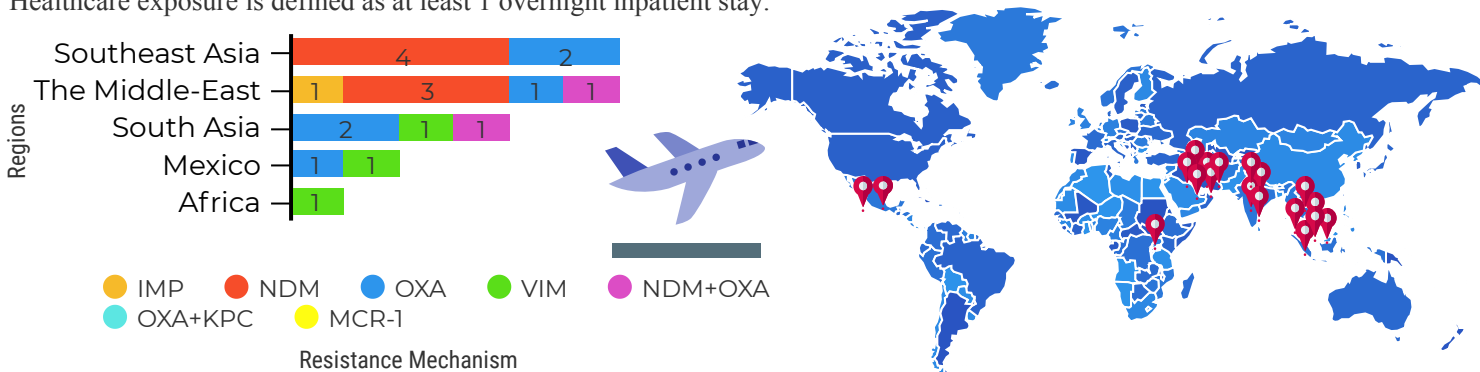
have stayed in a high risk setting 6 months prior to culture collection date



Highlights of findings (continued):

Figure 1F: Exposure to healthcare internationally.

Among 51 cases with information available, 19 (37.3%) had international healthcare exposure 6 months prior to culture collection. Healthcare exposure is defined as at least 1 overnight inpatient stay.



Recommendations:

LAC DPH recommends that healthcare providers in Los Angeles County take the following actions to decrease the prevalence and slow the spread of N-MDROs in LAC:

1. Ask if a patient has received medical care somewhere else, including in another country within the past 6 months. If the patient has, consider screening for carbapenemase-producing organisms.
2. Place patients currently or previously colonized or infected with MDRO on Contact Precautions. Whenever possible, dedicate rooms, equipment, and staff to MDRO patients. Utilize the Novel MDRO Risk Assessment in LAC DPH's N-MDRO website to determine if the patient is a high-risk patient.³
3. Wear gown and gloves when caring for patients with N-MDROs.
4. Perform hand hygiene- use alcohol-based hand rub or wash hands with soap and water before and after contact with the patient or their environment.
5. Make sure labs immediately alert clinical and infection prevention staff when N-MDROs are identified.
6. Discontinue invasive devices like urinary catheters as soon as no longer necessary.
7. Prescribe and use antibiotics wisely.⁴
8. Educate your patients about Novel Multi-Drug Resistant Organisms. Utilize LAC DPH's Carbapenemase-Producing Organisms (CPO) website.⁵
9. Alert the receiving facility when you transfer a N-MDRO patient and find out when a patient with a N-MDRO transfers into your facility. Use the LAC DPH inter-facility form for guidance.⁶
10. Maintain awareness of facility CRE rates and community-wide CRE rates by reading LAC DPH's annual antibiogram.⁷

Moving Forward

Please report N-MDRO cases to LAC DPH at (213)288-7940 or fax to (213)482-4856. We highly encourage that even if healthcare facilities are not sure, if they feel that the lab result is strange or concerning to go ahead and report it to LAC DPH.

Beginning 2019, LAC DPH will be distributing newsletters in a quarterly basis to update healthcare professionals about LAC DPH's N-MDRO surveillance efforts, emerging N-MDROs, and updated resources to help HCFs detect and contain N-MDROs.

Questions? Send to hai@ph.lacounty.gov



Resources:

1. **Containing Unusual Resistance. Centers for Disease Control and Prevention (CDC).**
<https://www.cdc.gov/vitalsigns/containing-unusual-resistance/index.html>
2. **Los Angeles County Department of Public Health. Acute Communicable Disease Control Program- Carbapenem-Resistant Enterobacteriaceae (CRE).**
<http://publichealth.lacounty.gov/acd/Diseases/CRE.htm>
3. **Los Angeles County Department of Public Health. Acute Communicable Disease Control Program- Novel Multi-Drug Resistant Organisms (N-MDROs).**
<http://publichealth.lacounty.gov/acd/Diseases/NMDRO.htm>
4. **Los Angeles County Department of Public Health. Acute Communicable Disease Control Program- Antimicrobial/ Antibiotic Resistance.**
<http://publichealth.lacounty.gov/acd/AntibioticResistance.htm>
5. **Los Angeles County Department of Public Health. Acute Communicable Disease Control Program- Carbapenemase-Producing Organisms (CPO).**
<http://publichealth.lacounty.gov/acd/Diseases/CPO.htm>
6. **Los Angeles County Department of Public Health. Acute Communicable Disease Control Program- Inter-facility Transfers Guide.**
<http://publichealth.lacounty.gov/acd/docs/InterfacilityTransfersGuide.pdf>
7. **Los Angeles County Department of Public Health. Acute Communicable Disease Control Program- Antibiograms.**
<http://publichealth.lacounty.gov/acd/antibiogram.htm>