

MLS Laboratory Update: Increases in NDM-CRE in the United States

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Purpose of this Message:

To raise awareness of a new Centers for Disease Control and Prevention (CDC) report that warns of increases in NDM-CRE and urges healthcare provider awareness and testing. To also provide information on incidence of these organisms in Minnesota and a reminder of the criteria for submission of isolates. This information is also being shared with infection preventionists in Minnesota.

Action Item:

Please review criteria for submission of isolates and forward this message to other healthcare partners, as appropriate.

Background:

Through the CDC's [Antimicrobial Resistance Laboratory Network](https://www.cdc.gov/antimicrobial-resistance-laboratory-networks/php/about/domestic.html) (<https://www.cdc.gov/antimicrobial-resistance-laboratory-networks/php/about/domestic.html>), CDC experts have detected a substantial rise in carbapenemase-producing carbapenem-resistant Enterobacterales (CP-CRE), especially in CP-CRE producing the New Delhi metallo- β -lactamase (NDM) carbapenemase. This increase in NDM-CRE has also been observed in complementary CDC surveillance platforms.

These increases in CP-CRE and NDM-CRE threaten to reverse years of stable or declining CRE rates and are particularly concerning due to the limited treatment options for CRE infections involving these resistance mechanisms.

A CDC paper recently published in the *Annals of Internal Medicine* "[Changes in Carbapenemase-Producing Carbapenem-Resistant Enterobacterales, 2019 to 2023](https://www.acpjournals.org/doi/10.7326/ANNALS-25-02404)" (<https://www.acpjournals.org/doi/10.7326/ANNALS-25-02404>) describes the changes in carbapenemase genes in CRE isolates from 2019 to 2023. Findings include:

- In a cohort of 29 U.S. states with mandated submission of CRE isolates, including Minnesota, the incidence of CP-CRE isolates from clinical cultures increased dramatically overall between 2019 and 2023.
- The increased incidence was primarily driven by a five-fold increase in the incidence of NDM-CRE and a smaller increase in OXA-48-like-CRE.
- Preliminary data from 2024 indicate NDM-CRE remained at or above 2023 levels.

Incidence of CP-CRE in Minnesota:

For Minnesota, the analysis shows that overall CP-CRE rates increased by 66% over the past five years, driven largely by a near doubling of NDM-CRE incidence. NDM-CRE has increased by 94% from 2019-2023. In contrast, KPC-CRE incidence remained stable.

Age-Adjusted Incidence Rates/100,000 Persons

Mechanism	2019	2020	2021	2022	2023	% Change (95% CI)
All CP-CRE	0.61 (0.43, 0.83)	0.47 (0.32, 0.67)	0.61 (0.44, 0.82)	0.69 (0.53, 0.90)	1.03 (0.80, 1.32)	66% (13, 146)
KPC-CRE	0.29 (0.18, 0.46)	0.18 (0.10, 0.32)	0.27 (0.16, 0.43)	0.32 (0.21, 0.48)	0.24 (0.13, 0.41)	No change
NDM-CRE	0.24 (0.14, 0.40)	0.14 (0.07, 0.26)	0.20 (0.11, 0.34)	0.25 (0.15, 0.39)	0.46 (0.31, 0.66)	94% (8, 263)

Submission of CRE isolates:

CRE: an Enterobacterales isolate resistant to any 1 carbapenem (imipenem ≥ 4 , meropenem ≥ 4 , doripenem ≥ 4 , ertapenem ≥ 2) by current CLSI breakpoints or positive by a carbapenemase detection test, such as: mCIM, CARBA5, or PCR (KPC, NDM, IMP, VIM, OXA, etc.).

- Note: Imipenem MICs for *Proteus* spp., *Providencia* spp., and *Morganella morganii*, tend to be higher and, therefore, a carbapenem other than imipenem must be resistant for these organisms to meet the CRE definition.
- Submit copy of antimicrobial susceptibility testing results from clinical lab with the isolate.
- CRE are reportable and submittable per the MN Reportable Disease Rule (<https://www.health.state.mn.us/diseases/reportable/rule>).

Additional Information

To increase timely detection, guide treatment, and prevent the spread of CRE, healthcare providers should:

- Understand if their clinical laboratories have the testing capabilities to identify different carbapenemase genes or access testing through their public health laboratory.
- Consult with their Healthcare-associated Infections and Antimicrobial Resistance (HAI/AR) Program to understand local CRE resistance mechanisms in their area.
- Implement [Carbapenem-resistant Enterobacterales \(CRE\) infection prevention and control measures](https://www.cdc.gov/cre/hcp/infection-control/index.html) <https://www.cdc.gov/cre/hcp/infection-control/index.html>

Resources:

- Project Firstline:
https://www.health.state.mn.us/facilities/patientsafety/infectioncontrol/pfl/training/mdro_cpo.pdf
- For additional context and to explore antimicrobial resistance and patient safety data, please visit [CDC's Antimicrobial Resistance and Patient Safety Data Portal](https://arpsp.cdc.gov/profile/arln?tab=ar-lab-network) (<https://arpsp.cdc.gov/profile/arln?tab=ar-lab-network>). This interactive platform provides state and national-level visualizations on pathogens, resistance mechanisms, and healthcare-associated infection trends, offering tools to support facility-level infection prevention and stewardship efforts.

Questions:

For laboratory–related questions please contact Paula Vagnone, Microbiology Unit Supervisor, at 651-201-5581.

To connect with the MDH HAI Team, contact HEALTH.HAI@state.mn.us

Thank you for your assistance in combatting antibiotic resistance.

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