Management of a multi-facility outbreak of Carbapenem-resistant *Enterobacterales* (CRE) producing New Delhi Metallo-beta-lactamase (NDM) in North Texas

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Background

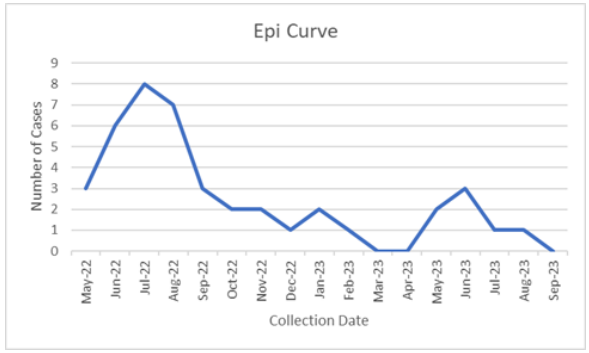
During the ongoing Candida auris outbreak in North Texas, healthcare facilities have been on high alert for different MDROs in their facilities. The emergence of bacteria that produce Carbapenemases, such as New Delhi metallo-beta-lactamase (NDM), has raised major public health concerns. A detailed epidemiological approach is needed when an acute care hospital experiences an NDM CRE outbreak. This poster explores an outbreak of NDM CRE in North Texas, as a case study, and the steps taken to manage the outbreak and prevent additional cases.

Public Health

Methods

In May 2022, an acute care hospital (ACH) reported an NDM CRE case to the local health department (LHD). Discussion was held between the LHD and state health department on the Centers for Disease Control and Prevention (CDC) tiered NDM CRE approach. Telephone discussions occurred between the LHD, ACH, and the state health department followed by an in-person Infection Control Assessment Response (ICAR). An ICAR was conducted with the ACH and infection control gaps were identified. Point Prevalence study was not initiated with the ACH due to the invasive method of specimen collection. Active surveillance and Transmission Based Precaution were implemented with the ACH. CRE isolates were confirmed at the state laboratory and were sent to the Antibiotic Resistance Laboratory Network (ARLN) laboratory. Whole genome sequence (WGS) was performed by the CDC Laboratory.

Results



From May 2022 through August 2023, The LHD received 43 NDM CRE case reports. Collection dates ranged from May 14, 2022, to September 8, 2023. Of the 43 cases 30.95% (n=13) were male, 69.04% (n=29) were female. The age range was from 18 years to 91 years with a mean age of 67 years and median age of 69 years. There were 7 different organisms identified: *Acinetobacter baumanii* (n=1), *Citrobacter amalonaticus* (n=1), *Escherichia coli* (n=9), *Enterobacter asburiae* (n=1), *Klebsiella oxytoca* (n=2), *Klebsiella pneumoniae* (n=15), and *Klebsiella variicola* (n=6). WGS was performed on 14 isolates, 13 of which originated from two acute care facilities and one from a clinic. There was relatedness shown between the isolates that underwent WGS.

Conclusion

Early identification helped the LHD place close contacts on contact isolation. WGS results supported the epidemiology data showing relatedness between cases and indicated transmission within facilities. 14 isolates were sent for analysis and the isolates shared the plasmid, NDM-4, showing relatedness. The following recommendations were also offered to facilities to improve infection control practices.

- Review and re-educate staff on PPE donning/doffing and hand hygiene practices
- Educate staff and raise awareness of NDM mechanism and the need to increase surveillance practices
- Emphasize paying attention to peri care consistent processes for disinfection of invasive devices
- Increase frequency of EVS, hand hygiene, and PPE audits
- Proper use of disinfectants

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