

An Outbreak Investigation of KPC-producing *Carbapenem Resistant Enterobacterales* in a Texas Acute Care Hospital

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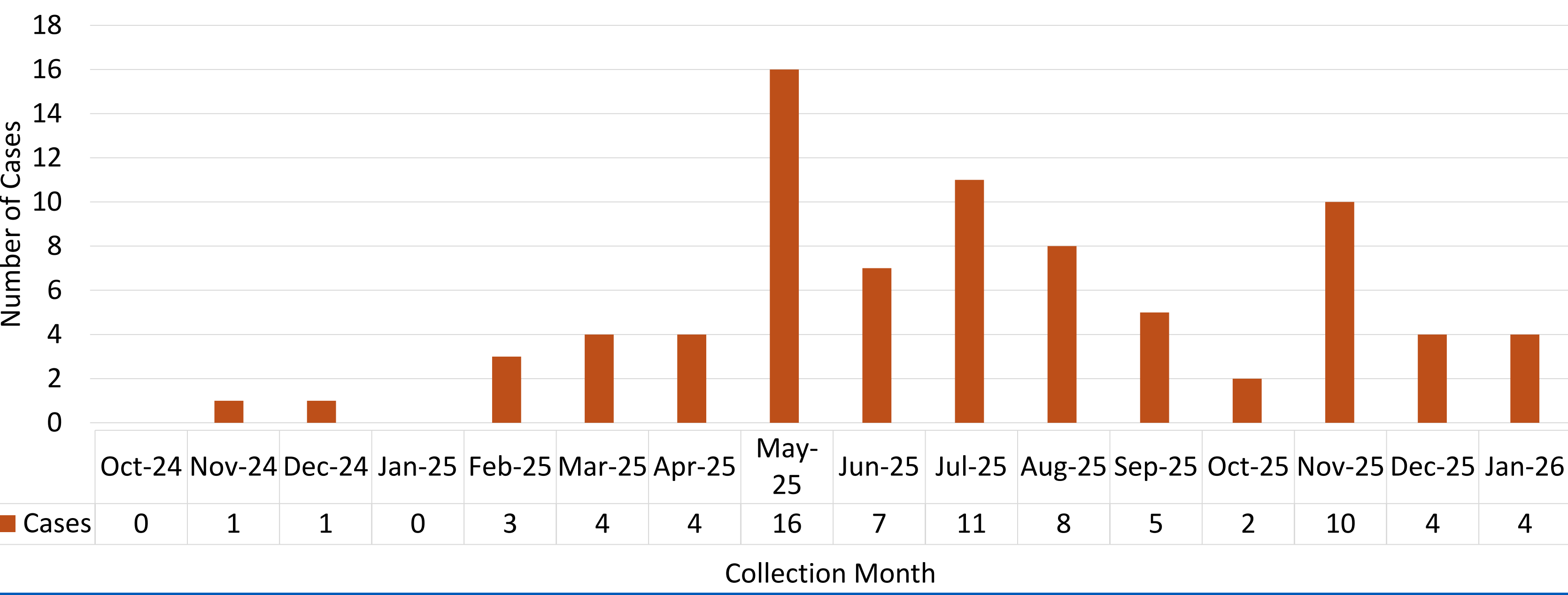
Background

- Carbapenem-resistant Enterobacterales (CRE) are a group of Gram-negative bacteria that are hard to treat because they are resistant to common antibiotics and can cause severe infections.¹
- CRE spreads through contact with colonized or infected patients or contaminated surfaces.¹
- CREs may contain enzymes called carbapenemases that make carbapenems, a last-resort antibiotic, ineffective.²
- One of the most common carbapenemases is *Klebsiella pneumoniae* carbapenemase (KPC). However, the true number of cases is unknown because it is not always routinely tested for in hospitals or laboratories.²
- In March 2025, the Texas Department of State Health Services (DSHS) public health laboratory identified 9 KPC-producing CREs from the same acute care hospital that had not previously reported any cases. Healthcare-associated infections (HAI) epidemiologists initiated a public health investigation to determine if infections were acquired at the hospital.

Methods

- Conducted surveillance for all KPC-producing CRE isolates submitted by the hospital since October 2024.
- Created an epidemiological curve to visualize case trends (Figure 1).
- Assessed genetic relatedness of isolates to identify clusters and potential transmission through public health laboratory testing.
- Performed an onsite infection control assessment (ICAR) at the hospital using CDC ICAR tools and observed personal protective equipment (PPE) use, hand hygiene, and isolation practices.

Figure 1: Epidemiological Curve of KPC-producing Carbapenem-Resistant Enterobacterales at an Acute Care Hospital in Texas, 2024-2026



Results

- From October 2024 to January 2026, 89 KPC-producing CRE isolates from the same hospital were identified through public health laboratory testing (Figure 1).
- Eight different species of KPC-producing CRE were identified: *Klebsiella variicola* (n=39), *Klebsiella pneumoniae* (n=27), *Escherichia coli* (n=12), *Klebsiella oxytoca* (n=6), and four other species (n=9).
- Cluster analyses revealed close genetic relatedness only among *Klebsiella variicola* isolates.
- Onsite ICAR observations showed lack of adherence to appropriate PPE donning and doffing, hand hygiene practices, or isolation duration (Table 1).

Table 1: Summary observations and recommendations for onsite infection control assessment

Type of Observation	Infection Control Recommendations
Personal Protective Equipment (PPE)	<ul style="list-style-type: none"> • Educate staff on proper PPE selection, donning and doffing based on patient infection status. • Increase PPE usage audits for isolation rooms.
Hand Hygiene	<ul style="list-style-type: none"> • Educate staff on proper hand hygiene practices, including when and how to perform hand hygiene. • Increase hand hygiene audits for all units.
Isolation Duration	<ul style="list-style-type: none"> • Educate staff on CRE isolation duration: Contact Precautions should be maintained for the duration of hospital stay.

Conclusion

- Voluntary isolate submission to public health laboratories identified previously unrecognized KPC-producing CRE cases at the hospital.
- *K. variicola* emerged as a key species of interest, representing the most common isolate and the only species showing close genetic relatedness.
- Gaps in PPE use, hand hygiene compliance, and isolation practices likely contributed to transmission.
- Strengthening education on CRE, and proper PPE, hand hygiene, and isolation practices may help prevent future cases.

Acknowledgements

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1. Centers for Disease Control and Prevention (2025). [About Carbapenem-resistant Enterobacterales \(CRE\) | CRE | CDC](#)
 2. Centers for Disease Control and Prevention (2025). [CRE Carbapenem-resistant Entrobacterales Handout](#)