

Background

- The CDC recommends that institutions in which carbapenemase-producing *Enterobacteriaceae* (CPE) is endemic perform active surveillance testing and maintain contact precautions for patients infected/colonized with CPE.¹
- The CDC does not provide guidance regarding discontinuation of contact precautions for patients infected/colonized with CPE.¹
- Through retrospective review of our institution's CPE surveillance program, we sought to determine the utility of serial screening in predicting clearance of CPE colonization.

CPE Surveillance and Infection Control Measures

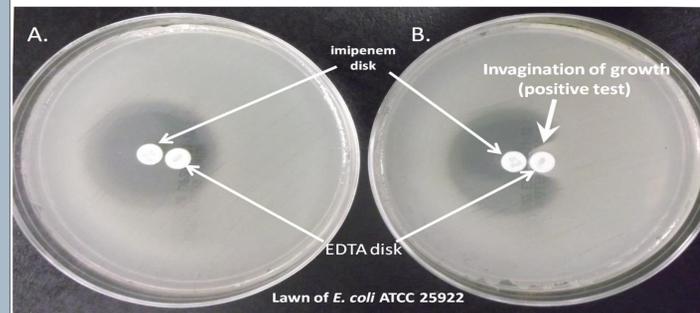
- In April 2009, the University of Virginia Health System (UVaHS) initiated CPE surveillance:
 - Weekly perirectal cultures for all patients in select ICUs, at the long-term acute care hospital, and on all units on which a CPE-positive patient was present
 - Admission perirectal cultures for patients transferred from regions in which CPE is endemic or who were otherwise designated as high-risk for CPE colonization by the Hospital Epidemiologist
- All CPE-colonized/infected patients were maintained on contact precautions and a long-term indicator was entered in the electronic medical record.
- Follow-up perirectal cultures were collected on known CPE-colonized patients who were not receiving antibacterials, no sooner than 8 weeks after the initial positive culture, at an outpatient clinic visit or upon readmission to the hospital.

Subjects

- Study period: April 2009 - August 2013
- All patients with a positive CPE perirectal culture obtained during the study period were included.
- Patients with CPE from clinical isolates but without perirectal colonization were not included.
- Recurrence of CPE-positivity was defined as a perirectal or clinical culture positive for carbapenemase production, following at least 1 negative perirectal culture.

Microbiology

- Screening perirectal swabs:
 - Placed in tryptic soy broth with a 10µg ertapenem disk, incubated for 24h, plated on CHROMagar.
 - Positives confirmed with *bla*_{KPC} PCR testing.
- Clinical isolates:
 - Possible production of ESBL identified with automated testing (VITEK 2)
 - Phenotypically screened with the indirect carbapenemase test.²
 - Positives by phenotypic test underwent *bla*_{KPC} PCR testing.



A. Negative Indirect Carbapenemase Test
B. Positive Indirect Carbapenemase Test

Source: Mathers, et al. *J Clin Microbiol* 2013;51:1291-1293.

Results

- 142 patients had positive CPE perirectal cultures during the study period.

Mean age, y (range)	57 (1-89)
Male gender, n (%)	81 (57)
Race, n (%)	
Asian	2 (1)
Black	12 (8)
Hispanic	3 (2)
White	120 (85)
Other	5 (4)
Comorbidities, n (%)	
Transplant*	25 (18)
Cancer	12 (8)
HIV/AIDS	0 (0)
Kidney disease	66 (46)
Liver disease	46 (32)

* 16 liver, 6 kidney, 1 kidney-pancreas, and 2 lung transplants

- 95 patients had ≥ 1 follow-up perirectal culture.

Previous Sequential Negative Cultures	Next Culture Negative / Number at Risk (%)
0 (first culture)	51 / 95 (53.7)
1	24 / 31 (77.4)
2	17 / 20 (85.0)
≥3	6 / 8 (75.0)

- After 3 consecutive negative CPE perirectal cultures, 6 of 8 patients remained CPE-negative on all subsequent cultures (1-9 additional cultures).
- One patient had CPE recurrence after 3 consecutive negative screens.
 - Initially perirectally colonized with *E. cloacae*
 - Recurred with *bla*_{KPC}-positive *Citrobacter sp.* on perirectal culture nearly 8 months later
- A second patient had CPE recurrence after 5 consecutive negative screens.
 - Initially perirectally colonized with *K. oxytoca*
 - Recurred with *K. pneumoniae* on perirectal culture 4 months later

Conclusions

- The CDC supports discontinuation of contact precautions for patients colonized/infected with MRSA or VRE following 3 consecutive negative surveillance cultures obtained while the patient is not receiving antimicrobials.³
- There is little data on the natural history of CPE colonization and the predictive utility of CPE surveillance cultures.
- We found a 25% recurrence rate of CPE colonization after ≥ 3 consecutive negative perirectal cultures.
- Extrapolation of data used to support discontinuation of contact precautions for MRSA- or VRE-colonized patients is not sufficient to determine when contact precautions can safely be discontinued for CPE-colonized patients.
- Larger prospective studies are needed to define the natural history of CPE colonization and evaluate the utility of surveillance cultures in predicting clearance of colonization.

Select References

- Guidance for Control of Carbapenem-resistant *Enterobacteriaceae* (CRE) - 2012 CRE Toolkit. (<http://www.cdc.gov/hai/organisms/cre/cre-toolkit/>)
- Mathers AJ, et al. *J Clin Microbiol* 2013;51:1291-3.
- The Healthcare Infection Control Practices Advisory Committee. Management of Multidrug-Resistant Organisms In Healthcare Settings. Department of Health and Human Services, ed.2006.

Acknowledgements

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