CDC Vital Signs: Containing Unusual Resistance

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The US Experience: KPC

Isolate collected in 1996 during an ICU surveillance project from NC
States with *Klebsiella pneumoniae* carbapenemase (KPC)-producing Carbapenem-resistant Enterobacteriaceae (CRE) confirmed by CDC

KPC-CRE found in the US spread from 2 states in 2001 to 49 states, DC, and PR in 16 years.

2001

2005

2006

2008

2010

2012

2014

2017

States with *Klebsiella pneumoniae* carbapenemase (KPC)-producing Carbapenem-resistant Enterobacteriaceae (CRE) confirmed by CDC.

Division of Healthcare Quality Promotion

On April 3, 2018, this report was posted as an MMWR Early Release on the MMWR website (https://www.cdc.gov/mmwr).
• Once antibiotic resistance spreads, it is harder to control.

• Finding and responding to unusual resistance early, before it becomes common, can help stop its spread and protect people.
Main Points

- CDC’s Containment Strategy is an aggressive approach to stop the spread of “unusual” AR.

- Based on identification of a single isolate not a cluster

- Often targeting a “mechanism” instead of a bacteria
  - CP-CRE, CP-Acinetobacter and Pseudomonas
  - Candida auris
  - Pan-resistant strains
The Containment Strategy

- Rapid detection in health care facilities
- Infection control assessments led by the health department
- Colonization screenings, when needed
- Coordination between healthcare facilities
- Continued vigilance until spread is controlled
Antimicrobial Resistance Laboratory Network (ARLN): Laboratory Support for Containment

Hospitals/Clinical Laboratories

- CRE/CRPA isolates
- Rectal Swabs

Public Health Laboratories

- 50 States
- 5 Local Health Departments
- Species identification
- Confirmatory AST
- Phenotypic screening for carbapenemase production
- Carbapenemase mechanism testing
- mcr-1 testing (some labs)

Regional Lab

- CRE and CRPA Colonization Screening
Containment Strategy: Be on guard to contain the first spark.

THE NATION CAN IDENTIFY AND RESPOND TO UNUSUAL ANTIBIOTIC RESISTANCE

In addition to leading the Containment Strategy, CDC is working with other Federal agencies to combat antibiotic resistance nationwide by preventing infections and improving antibiotic use. CDC’s activities are supported by ongoing resources from Congress.

- 7 AR Lab Network Regional Labs
- 56 AR Lab Network State and Local Labs
- 500+ Local Staff to Combat AR
- 35 Advanced Programs to Prevent Spread & Improve Antibiotic Use
- 49 Projects Exploring Innovative Detection & Prevention
Results to Date

- January - September 2017
  - 4,442 CRE and 1,334 CRPA were tested to identify most concerning strains
    - 1,426 (255) were carbapenemase-producing strains
  - 1489 screening tests were performed as part of 70 surveys
    - Average of 10.5 patients/residents screened per survey
      - 11% were positive
    - Helped identify higher risk facilities were amplification occurring
Illustrative Example

- Unusual carbapenemase-producing isolate identified from a resident of a LTCF (IMP)
- DOH conducted site visit to assess interventions and perform PPS
  - 5 additional colonized residents identified
- DOH conducted additional IC assessments and additional PPS
  - Two f/u surveys without evidence of additional transmission
Impact of Targeted Interventions

FIGURE 1. Percentage of *Escherichia coli* and *Klebsiella pneumoniae* isolates from selected health care-associated infections* with the extended-spectrum-β-lactamase (ESBL) phenotype reported as nonsusceptible to extended-spectrum cephalosporins - National Healthcare Safety Network, United States, 2006-2015

FIGURE 2. Percentage of *Escherichia coli* and *Klebsiella pneumoniae* isolates from selected health care-associated infections* reported as resistant to a carbapenem - National Healthcare Safety Network, United States, 2006-2015

ESBL phenotype

CRE phenotype
Simulating an Outbreak: The Containment Strategy Can Slow Transmission

Courtesy of Prabasaj Paul and Rachel Slayton
What Can People Do?

Health Care Facilities can:

- Plan for unusual resistance arriving in your facility. Find resources: www.cdc.gov/hai/outbreaks/mdro

- **Leadership:** Work with the health department to stop spread of unusual resistance. Review and support infection control in the facility.

- **Clinical labs:** Know what isolates to send for testing. Establish protocols that immediately notify the health department, health care provider, and infection control staff of unusual resistance. Validate new tests to identify the latest threats. If needed, use isolates from wwwn.cdc.gov/arisolatbank/.

- **Healthcare providers, epidemiologists, and infection control staff:** Place patients with unusual resistance on contact precautions, assess and enhance infection control, and work with the health department to screen others. Communicate about status when patients are transferred. Continue infection control assessments and colonization screenings until spread is controlled. Ask about any recent travel or health care to identify at-risk patients.
Thanks for Your Attention

For more information, contact CDC
1-800-CDC-INFO (232-4636)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.