National Center for Emerging and Zoonotic Infectious Diseases

Update on Containment and Control of Emerging Resistance

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2018 Epidemiology and Laboratory Capacity for Infectious Diseases (ELC) Healthcare-associated Infections (HAI), Antimicrobial Resistance (AR), and Infection Control and Response (ICAR) Supplement Grantees' Meeting

March 20

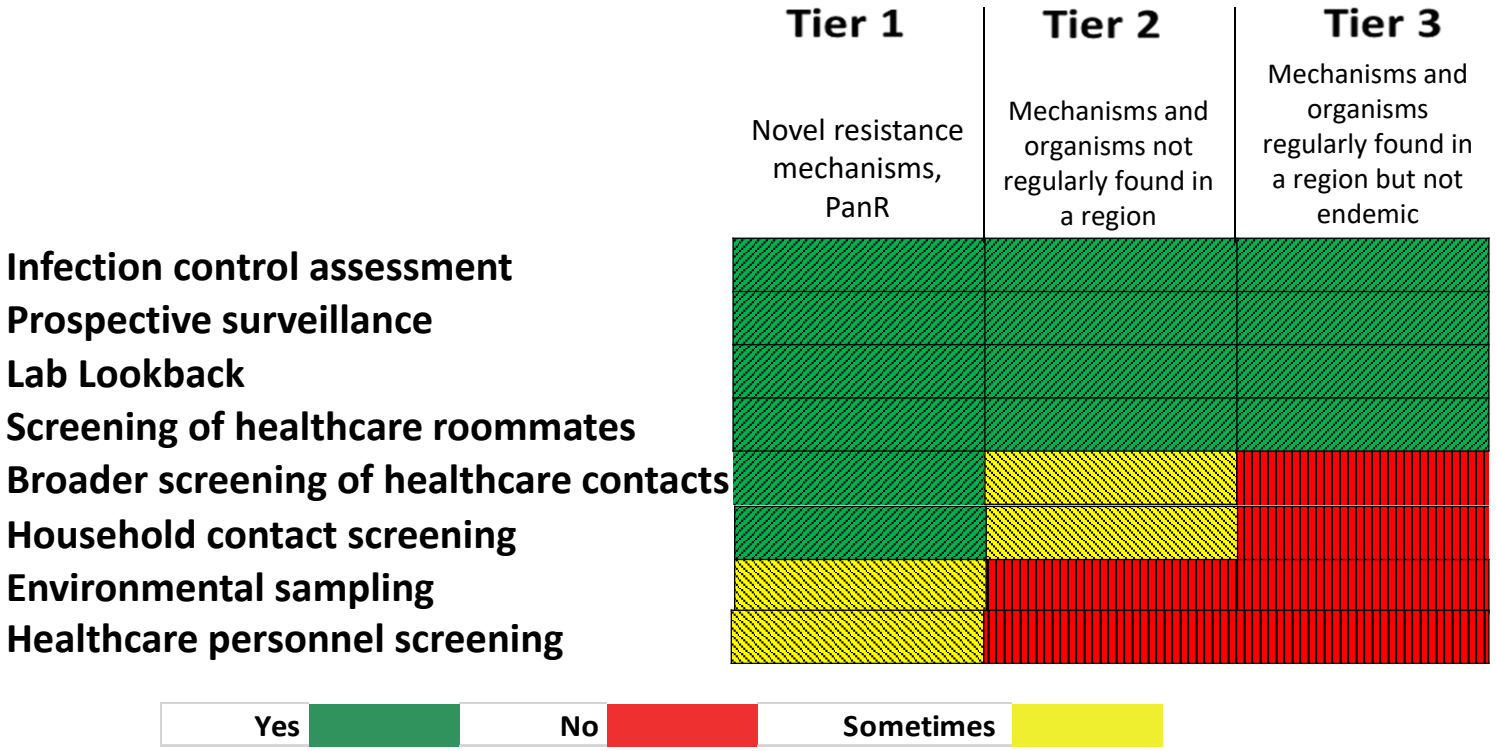
Objectives

- Review containment principles
- Discuss current epidemiology and insights from containment and ARLN
- Describe resources available

Containment strategy

- Goal: slow spread of novel or rare multidrug-resistant organisms or mechanisms
- Systematic, aggressive response to **single cases** of high concern antimicrobial resistance
- Main components
  - Detection
  - Infection control assessments
  - Screening for asymptomatic colonization

Containment response elements



Epidemic stages (modified from Grundmann et al.)

- 0 – No cases reported
- 1 – Sporadic occurrence – single cases not epidemiologically related
- 2 - Single facility outbreaks - ≥2 epi-linked cases in one facility
- 3 – Regional spread - >1 facility cluster within one referral network
- 4 – Interregional spread – multiple clusters occurring within different referral networks
- 5 – Endemic – most facilities are repeatedly seeing cases admitted from unrelated sources

Epidemic stages (modified from Grundmann et al.)

“Containment”

- 0 – No cases reported
- 1 – Sporadic occurrence – single cases not epidemiologically related

Epidemic stages (modified from Grundmann et al.)

Kind of “containment”

- 0 – No cases reported
- 1 – Sporadic occurrence – single cases not epidemiologically related
- **2 - Single facility outbreaks - ≥2 epi-linked cases in one facility**

Epidemic stages (modified from Grundmann et al.)

- 0 – No cases reported
- 1 – Sporadic occurrence – single cases not epidemiologically related
- **2 - Single facility outbreaks - ≥2 epi-linked cases in one facility**
  - Control Measures
    - Ongoing facility screens (usually 2 negatives to document the end of transmission)
    - Screening connected facilities
    - Usually ongoing infection control assistance

Epidemic stages (modified from Grundmann et al.)

Less like “containment”

- 0 – No cases reported
- 1 – Sporadic occurrence – single cases not epidemiologically related
- 2 - Single facility outbreaks - ≥2 epi-linked cases in one facility
- **3 – Regional spread - >1 facility cluster within one referral network**

Epidemic stages (modified from Grundmann et al.)

- 0 – No cases reported
- 1 – Sporadic occurrence – single cases not epidemiologically related
- 2 - Single facility outbreaks - ≥2 epi-linked cases in one facility
- **3 – Regional spread - >1 facility cluster within one referral network**
  - Control Measures:
    - Ongoing screening (usually 2 point prevalence surveys (PPS) with no new positives to document the end of transmission)
    - Screening connected facilities
    - Usually ongoing infection control assistance
    - Think about “bridge facilities” outside region

Epidemic stages (modified from Grundmann et al.)

Still important but not “containment”

- 4 – Interregional spread – multiple clusters occurring within different referral networks
- 5 – Endemic – most facilities are repeatedly seeing cases admitted from unrelated sources

Epidemic stages (modified from Grundmann et al.)

Still important but not “containment”

- 4 – Interregional spread – multiple clusters occurring within different referral networks
- 5 – Endemic – most facilities are repeatedly seeing cases admitted from unrelated sources
  - Control Measures
    - Less evidence to guide strategy
    - Regional approach likely most sustainable and impactful
      - Leadership from central authority, enhanced infection control, active surveillance (admission and/or other screening)
    - ARLN infrastructure can be used for detection, outbreak response

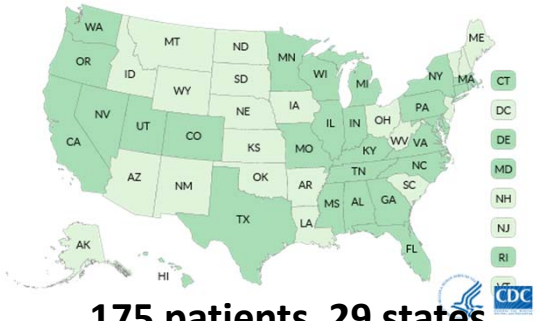
Epidemiology Updates

CRE Maps: NDM and OXA-48 Pre and Post ARLN

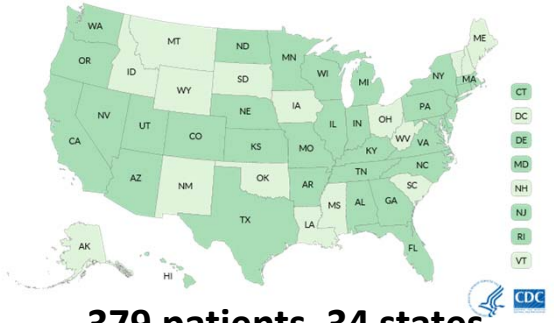
January 1, 2017

January 1, 2018

NDM

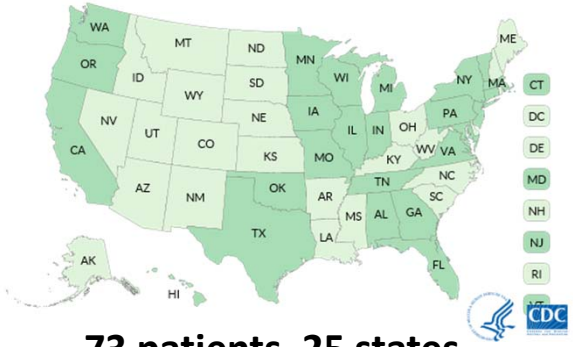


175 patients, 29 states

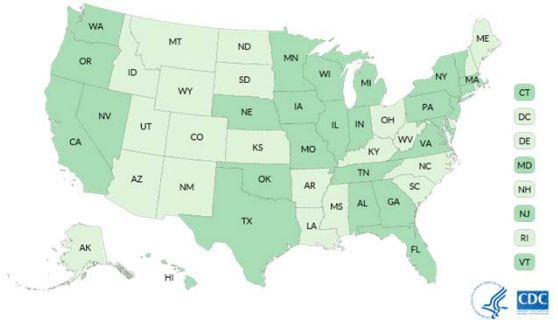


379 patients, 34 states

OXA-48



73 patients, 25 states



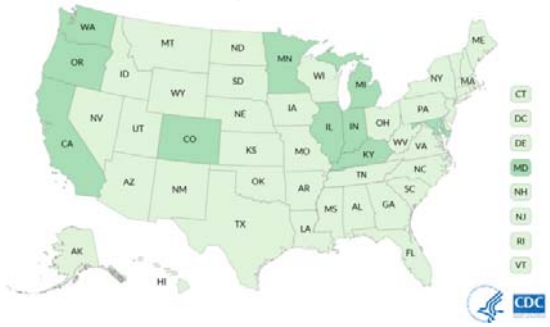
146 patients, 27 states

https://www.cdc.gov/hai/organisms/cre/trackingcre.html

CRE Maps: VIM and IMP Pre and Post ARLN

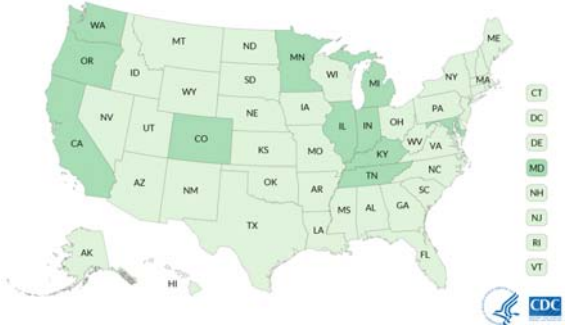
VIM

January 1, 2017



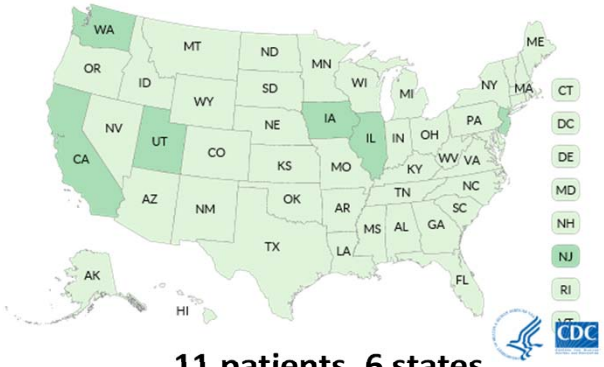
27 patients, 10 states

January 1, 2018



57 patients, 11 states

IMP



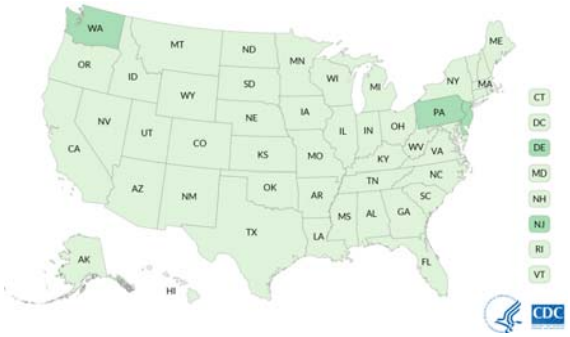
11 patients, 6 states

36 patients, 13 states

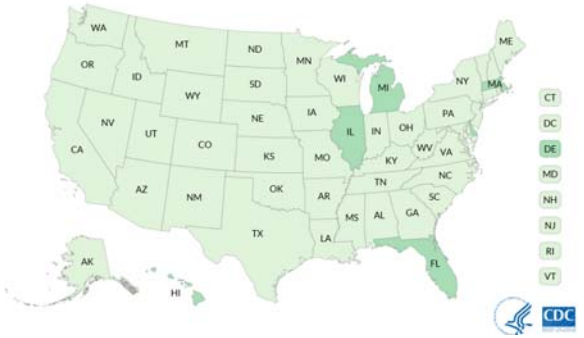
https://www.cdc.gov/hai/organisms/cre/trackingcre.html

Patients with CP-CRPA reported to CDC as of Dec 31, 2017

- As of December 31, 2016, 49 CP-CRPA had been reported to CDC

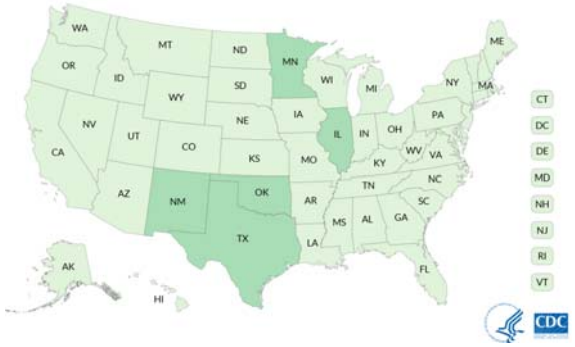


NDM: 7 patients, 4 states



KPC: 6 patients, 6 states

VIM: 86 patients, 12 states



IMP: 8 patients, 5 states

Colonization Screening

- ~10% of screening tests positive
- Yield higher in post-acute care than in short stay acute care
- In short stay acute care settings, contacts often discharged before screening can occur
  - Prospective surveillance critical for detecting ongoing transmission
- Multiple rounds of PPS and repeat IC assessments can be needed to control transmission
- Screening for one mechanism can identify hidden outbreaks with other mechanisms
- In outbreak setting, PPS can be augmented by
  - Recovery of isolate and PFGE
  - Admission screening

Common Themes

- Infection control assessments essential to gauging transmission risk
  - Often poor adherence despite report that patient is in Contact Precautions
- Transmission most often identified in long length of stay, high acuity settings
  - Lots of infection control practices that can be improved
  - Challenging settings with issues that are difficult to fix
- Transmission of CP-CRE rarely observed in short stay acute care settings
  - More commonly seen for *Acinetobacter, Candida auris,* and possibly CP-CRPA
- Repeat site visits often needed to control transmission
  - Especially when spread beyond a few cases

Challenges

- Resource intensive responses. How to make more sustainable?
  - Prioritize post-acute care settings for Tier 2 and 3 CP-CRE response
    - Exceptions: transplant units, burn units, suspected transmission
    - *Acinetobacter*, *C. auris* concerning for short stay acute care transmission
  - Improve health facility uptake to make screening more automatic/routine when cases identified
  - Focus on epi data needed for initial response
    - Recent overnight stays in healthcare facilities, contacts in these settings, travel outside the U.S. for non-KPC CP-CRE and CP-CRPA
- Different strategies needed for areas with regional spread or endemic resistance
- CLIA compliant screening not currently available for some resistance mechanisms (IMP variants, OXA-23, *mcr*) and for non-rectal swab specimen sources
  - Anticipated availability for later this year

Containment Resources

ARLN Admission Screening for Outbreak Response

- Case-by-case basis
- In response to outbreak
- Especially useful for KPC in areas where KPC is more common
- Post-acute care facilities with large burden of CP-CRE on initial PPS
  - Admission screening and every-other week PPS for 6-8 weeks
  - Describe epi
    - Imported cases – where from, which patients at risk?
    - Transmission – Feedback for improved infection control
  - Support from health department with onsite assessments if transmission detected

ARLN Admission Screening for Patients with Recent Healthcare Outside the United States

Distributed via the CDC Health Alert Network
February 14, 2013, 12:30 ET
CDCHAN-00341-02-14-2013

Following increased reports of non-KPC CRE, CDC now also recommends the following for patients with a history of an overnight stay in a healthcare facility (within the last 6 months) outside the United States :

•When a CRE is identified, test to determine the carbapenem resistance mechanism

•Consider each of the following:

- Perform rectal screening cultures to detect CRE colonization.
- Place patients on Contact Precautions while awaiting the results of these screening cultures.

ARLN Support for Containment –
Detection and Screening for patients with known risk factors

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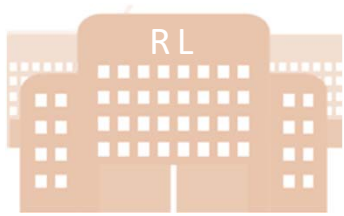
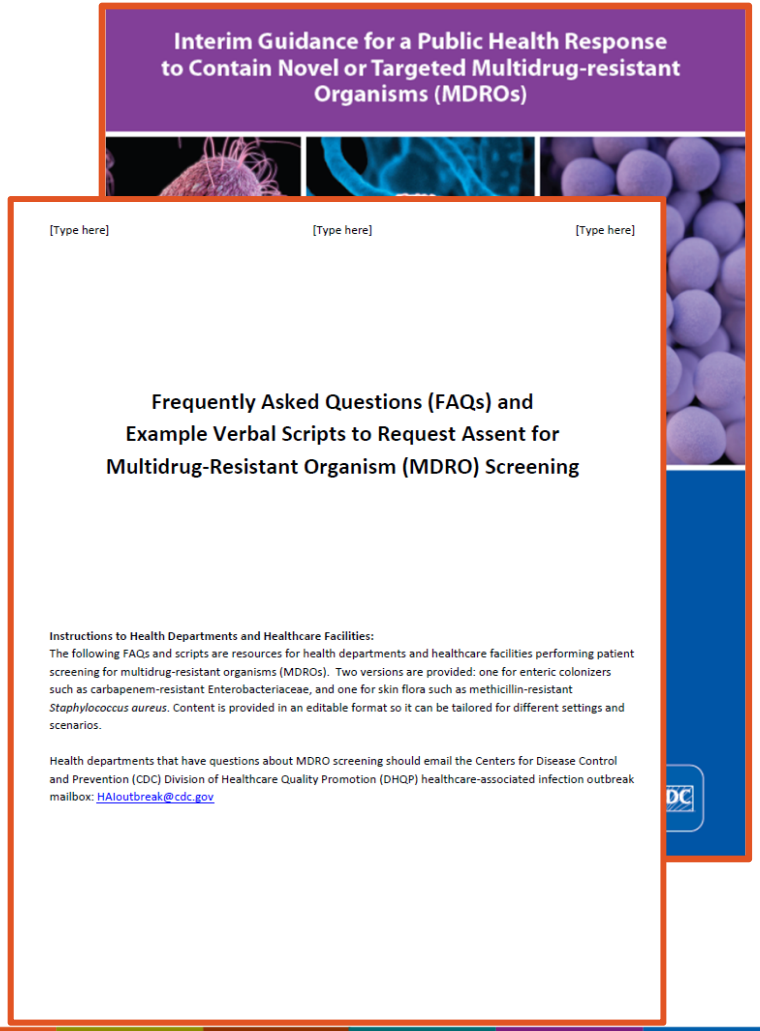


Regional lab

Containment Resources

- Containment guidance
- Example FAQs and consent script for screening
- Tabletop exercises
  - CRE from ELC 2017
  - CRPA from ELC 2018
- Epi or response questions: haioutbreak@cdc.gov



Thank you.

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov