

# Slowing the Spread Virginia Containment Strategy for Carbapenemase-Producing Organisms (CPOs)

An early, aggressive coordinated approach, as is recommended in the CDC Containment Strategy for Novel or Targeted Multidrug-resistant Organisms (Containment Strategy), can slow the emergence of resistant pathogens.

Comparing Annual Proportions of Extended Spectrum Beta-lactamases (ESBL) to Carbapenem Resistant Enterobacteriaceae (CRE) from 2006—2015.

## No Containment Strategy

ESBL-producing Enterobacteriaceae were first reported in 1988. Facilities independently selected approaches to control spread. Percentage of *E. coli* and *K. pneumoniae* with ESBL phenotype decreased by 2%.

SOURCE: CDC Vital Signs, April 2018

2%

## Containment Strategy

CRE was reported with increasing frequency beginning in 2001. CDC created CRE-specific guidance in 2009, now updated and referred to as the containment strategy for CRE. Percentage of *E. coli* and *K. pneumoniae* isolates resistant to carbapenems (CRE) decreased by 15%.

15%

CDC estimates the Containment Strategy would reduce CRE infections by 76%

VDH follows the CDC Containment Strategy for a specific type of carbapenem-resistant organism, those that are detected to produce a carbapenemase.

## Approach to Contain CPOs

Ensuring appropriate prevention measures are implemented

Identifying affected patients

The containment strategy includes:

Determining if transmission is occurring

Performing additional tests to guide response

Response activities have a tiered approach based on resistance mechanism attributes:

	CDC Definition	Applicable Organisms in Virginia
Tier 1	<ul style="list-style-type: none"> <li>Organisms and resistance mechanisms novel to the U.S., OR</li> <li>Organisms for which no current treatment options exist (pan-resistant) and that have the potential to spread more widely within a region</li> </ul>	<ul style="list-style-type: none"> <li>Novel carbapenemase resistance mechanism</li> <li>Pan-resistant CPOs</li> </ul>
Tier 2	<ul style="list-style-type: none"> <li>MDROs primarily found in healthcare settings but not found regularly in the region; organisms might be found more commonly in other areas in the U.S.</li> </ul>	<ul style="list-style-type: none"> <li>Carbapenemase-producing CRE (CP-CRE) caused by IMP, NDM, OXA, or VIM</li> <li>Carbapenemase-producing carbapenem-resistant <i>Pseudomonas aeruginosa</i> (CP-CRPA) caused by IMP, KPC, NDM, OXA, or VIM</li> </ul>
Tier 3	<ul style="list-style-type: none"> <li>MDROs that are already established in the U.S. and have been identified before in the region but are not thought to be endemic</li> </ul>	<ul style="list-style-type: none"> <li>CP-CRE cause by KPC</li> </ul>

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## Containment Strategy Elements

VDH follows the CDC Containment Strategy Guidelines. See a summary on page 3. For CPOs this includes:

### 1. Healthcare investigation

- For Tier 1 and Tier 2 organisms, public health will investigate healthcare exposures of the index case over the preceding month and up to 3 months.
- For Tier 3 organisms, public health will investigate current healthcare exposure and potentially exposure prior to admission up to the preceding one month.
- Healthcare facilities that previously cared for the index patient or other confirmed cases will be notified so that they can “flag” the patient’s record and initiate appropriate infection prevention precautions upon readmission.

### 2. Prospective lab surveillance

- Clinical laboratories that perform cultures from healthcare settings that the index case has been exposed to in the past 3 months should conduct prospective surveillance in order to identify organisms with similar resistance patterns from clinical cultures.

### 3. Retrospective lab surveillance

- Clinical laboratories should perform a one-time retrospective review (6-12 months) of results to identify organisms with similar resistance patterns. If available, the specimens should be sent to DCLS.

### 4. Onsite infection control assessment with observation of practices

- When a Tier 1 or Tier 2 organism is identified, health departments or other experts will conduct onsite visits to facilities and use a [standardized assessment tool](#) to evaluate infection control practices at facilities that have cared for the index case.
- When a Tier 3 organism is identified and there is confirmed or suspected transmission, health departments or other experts will conduct on-site visits to evaluate infection control practices.
- Assessments will include observations of infection control practices and recommendations to address observed gaps. VDH uses the [APIC and CDC developed QUOTs](#) when observing practices.
- Repeat on-site assessments might be needed to ensure that infection control gaps are fully addressed.

### 5. Colonization Screening of healthcare contacts

#### Screening of healthcare roommates

- For Tier 1 and Tier 2 organisms, roommates and patients that shared a bathroom with the index case should be identified and screened even if they have been discharged from the facility.
- For Tier 3 organisms, roommates and patients that shared a bathroom with the index case should be identified and screened if they are still admitted.

#### Broader screening of healthcare contacts

- If the index case was not on contact precautions during their entire stay OR the index case was on contact precautions but adherence to contact precautions is low OR the index case was on contact precautions but is high-risk for transmission (e.g., bedbound, has invasive medical devices, incontinent of stool or urine, etc.):
  - Screen healthcare contacts who are still admitted, AND overlapped with the index case, AND who have a risk factor for MDRO acquisition (e.g., being bedbound or requiring higher levels of care, being on antibiotics, or being on mechanical ventilation or having other invasive medical devices).
  - Alternatively, facilities may choose to screen entire units using point prevalence surveys.
- If the index case was on contact precautions during their entire stay (and adherence is high) at the facility, AND the index case is not high-risk for transmission:
  - Screening beyond healthcare roommates is generally not recommended.

Facilities should contact the [local health department as soon as they have identified a patient that matches the above criteria](#).

Colonization supplies are available at no charge through the Antimicrobial Resistance Laboratory (AR) Lab Network

### 6. Household contact screening

- Applicable only for novel carbapenemase mechanisms.
- May apply to pan-resistant CPO cases if household contact has extensive healthcare exposure.
- Would include close household contacts (e.g., contacts who help care for the index case or share a bed or bathroom with the patient).

### 7. Environmental sampling

- Not applicable except for Tier 1 organisms for situations in which questions about the effectiveness of terminal cleaning exist.

### 8. Healthcare personnel (HCP) screening

- Cultures of HCP might be recommended for a novel carbapenemase mechanism if the HCP had extensive contact with the index case and if epidemiology suggests the organism may have spread.

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## Containment Strategy Recommendation Summary

Containment Strategy Elements	Tier 1	Tier 1	Tier 2	Tier 2	Tier 3
	Novel Carbapenemase Mechanism	Pan-resistant CPO	CP-CRPA (IMP, KPC, NDM, OXA, VIM)	CP-CRE (IMP, NDM, OXA, VIM)	CP-CRE (KPC)
Healthcare investigation	Always	Always	Always	Always	Always
Prospective surveillance	Always	Always	Always	Always	Always
Retrospective lab surveillance	Always	Always	Always	Always	Sometimes
Onsite infection control assessment with observations of practices	Always	Always	Always	Always	Sometimes
Screening of healthcare roommates	Always	Always	Always	Always	Always
Broader screening of healthcare contacts	Always	Sometimes	Sometimes	Sometimes	Sometimes
Household contact screening	Always	Sometimes	Rarely	Rarely	Rarely
Environmental sampling	Sometimes	Rarely	Rarely	Rarely	Rarely
Healthcare personnel screening	Sometimes	Rarely	Rarely	Rarely	Rarely

## Roles and Responsibilities to Contain CPOs

Healthcare Facilities	
<ul style="list-style-type: none"> <li>Plan for unusual resistance arriving at your facility.</li> <li><b>Leadership:</b> Work with health department to stop spread of unusual resistance. Review and support infection prevention in your facility.</li> <li><b>Clinical labs:</b> Know what isolates to send for testing. Establish protocols that immediately notify health department, healthcare provider, and infection prevention staff of unusual resistance.</li> </ul>	<ul style="list-style-type: none"> <li><b>Healthcare providers, epidemiologists, and infection prevention staff:</b> Place patients with unusual resistance on contact precautions, assess and enhance infection prevention, and work with the health department to screen exposed patients. Communicate about patient status if transferred. Continue infection control assessments and colonization screenings until spread is controlled. Ask patients about any recent travel or healthcare.</li> </ul>
State and Local Health Departments	Everyone
<ul style="list-style-type: none"> <li>Educate healthcare facilities on state and local lab resources.</li> <li>Develop a plan to respond rapidly to unusual resistance genes.</li> <li>Coordinate with affected healthcare facilities, the AR Lab Network, and CDC for every identified case of unusual resistance.</li> <li>Provide timely lab results and recommendations to affected healthcare facilities and providers.</li> </ul>	<ul style="list-style-type: none"> <li>Inform your healthcare providers if you recently received healthcare in another country or facility.</li> <li>Practice good hand hygiene.</li> <li>Talk to your health care provider about preventing infections.</li> </ul>

For more information visit:

[CDC Containment Strategy](#)

[CDC Guidance for Control of CRE](#)

[VDH CRO Website](#)

