

**Vermont Healthcare Facilities may be Missing Carbapenem-resistant *Enterobacteriaceae* Infections**

To: Infection Preventionists and Clinical Laboratories  
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**– Please Distribute Widely –**

Carbapenem (imipenem, meropenem, ertapenem, doripenem)-resistant *Enterobacteriaceae* (CRE), a group of organisms resistant to many antimicrobial agents, is emerging as an important challenge in health care settings. Several Vermont healthcare facilities have treated patients with CRE.

**The criteria for susceptibility and resistance in these organisms have changed.** The tables below identify the changes. Your laboratory equipment may not have been updated to the newest settings. As a result, you might be missing cases of CRE.

New Interpretive Criteria for Carbapenems and *Enterobacteriaceae* – **USE THESE VALUES**

	Disk Diffusion (mm)			MIC (µg/mL)		
	Susceptible	Intermediate	Resistant	Susceptible	Intermediate	Resistant
Doripenem	≥23	20-22	≤19	≤1	2	≥4
Ertapenem	≥23	20-22	≤19	≤0.5	0.1	≥2
Imipenem	≥23	20-22	≤19	≤1	2	≥4
Meropenem	≥23	20-22	≤19	≤1	2	≥4

Old Interpretive Criteria for Carbapenems and *Enterobacteriaceae* – **DO NOT USE THESE**

	Disk Diffusion (mm)			MIC (µg/mL)		
	Susceptible	Intermediate	Resistant	Susceptible	Intermediate	Resistant
Ertapenem	≥19	16-18	≤15	≤2	4	≥8
Imipenem	≥16	14-15	≤13	≤4	8	≥16
Meropenem	≥16	14-15	≤13	≤4	8	≥16

**CRE are epidemiologically important for several reasons:**

- CRE have been associated with high mortality rates (up to 50% in some studies).
- In addition to β-lactam/carbapenem resistance, CRE often carry genes that confer high levels of resistance to many other antimicrobials, often leaving very limited therapeutic options. “Pan-resistant” strains have been reported.
- CRE have spread throughout many parts of the United States and have the potential to spread more widely.

**To help prevent the transmission of CRE within and between healthcare settings:**

- Report all CRE isolates to the infection preventionist.
- Implement contact precautions for patients colonized or infected with CRE.
- Report CRE isolates and their antibiotic susceptibility profiles to the Vermont Department of Health 24/7 by calling 802-863-7240 (800-640-4374 in Vermont).

The Health Department will:

- Arrange further testing of isolates, if warranted, at the CDC.
- Provide guidance on active surveillance for patients with epidemiologic links to CRE cases.
- Assist with contacting infected or exposed patients already discharged from your facility, and their healthcare providers, for any recommended follow-up.
- Assist with contacting receiving facilities or agencies (e.g., home health) to suggest prevention measures and arrange further testing, if needed.

For additional information, review the CDC **CRE Toolkit**:

<http://www.cdc.gov/hai/organisms/cre/cre-toolkit/>

**If any of the following organisms are determined to be resistant to carbapenems, they are CRE:**

More common genera of *Enterobacteriaceae*:

*Escherichia*  
*Enterobacter*  
*Klebsiella*

*Proteus*  
*Providencia*  
*Salmonella*

*Serratia*  
*Shigella*

Other genera of *Enterobacteriaceae*:

*Alishewanella*  
*Alterococcus*  
*Aquamonas*  
*Aranicola*  
*Arsenophonus*  
*Azotivirga*  
*Blochmannia*  
*Brenneria*  
*Buchnera*  
*Budvicia*  
*Buttiauxella*  
*Cedecea*  
*Citrobacter*  
*Cronobacter*  
*Dickeya*

*Edwardsiella*  
*Erwinia*  
*Ewingella*  
*Grimontella*  
*Hafnia*  
*Kluyvera*  
*Leclercia*  
*Leminorella*  
*Moellerella*  
*Morganella*  
*Obesumbacterium*  
*Pantoea*  
*Pectobacterium*  
*Phlomobacter*  
*Photorhabdus*

*Poodoomaamaana*  
*Plesiomonas*  
*Pragia*  
*Rahnella*  
*Raoultella*  
*Samsonia*  
*Sodalis*  
*Tatumella*  
*Trabulsiella*  
*Wigglesworthia*  
*Xenorhabdus*  
*Yersinia*  
*Yokenella*