

What is a carbapenemase-producing organism (CPO) and why is it important?

CPOs are **a type of bacteria that produce an enzyme** that **inactivates carbapenem antibiotics** (the antibiotic designed to treat them), which significantly limits treatment options.

They can also **easily share their antibiotic resistance** to other bacteria and can cause serious infections associated with high mortality. Examples include wound infections, bloodstream infections, and urinary tract infections.

CPOs **can spread quickly through health care settings** and transmission can occur among patients/residents/clients who may be colonized with a CPO.

CARBAPENEMASE EXAMPLES

- *Klebsiella Pneumoniae* Carbapenemase (KPC)
- New Delhi metallo-B-lactamase (NDM)
- Verona-intergron-mediated Carbapenemase (VIM)
- Imipenemase Metallo-B-lactamase (IMP)
- Oxacillinase-48-like beta-lactamase (OXA-48)*
- Carbapenemase producing Carbapenem-resistant *Acinetobacter baumannii* (CP-CRAB)

*Refer to page 3 for additional detail



Colonization is when an organism is found on or in the body but not causing symptoms.

Patients/residents/clients may remain colonized with a CPO for an unspecified time (e.g., years).

Infections



Colonization

Why does colonization matter?

Those colonized by a CPO can be a source of spread to others. They are also at a higher risk of developing a CPO infection than those who are not colonized. There are no signs or symptoms of colonization. Without testing, CPO colonization can go undetected and contribute to silent spread of resistant bacteria.

Pathways (how is it transmitted)

Touch

- Direct person-to-person contact (contact with contaminated hands, wounds, body fluids, or stool)
- Indirect contact with contaminated surfaces, equipment, and the environment
- Tasks involving complex medical care or high-contact care activities
- Examples may include toileting, bathing, wound care, ventilator, and catheter care

Environmental sources

- Premise plumbing such as sink drains, shower drains, and toilets can be important reservoirs contributing to CPO transmission

Who is most at risk?

Those who have:

- Recent admission to a nursing home, intensive care unit, or received complex medical care
- Immunocompromised conditions, wounds, or medical devices that stay in the body
- Had long courses of antibiotics
- Anyone admitted to a health care facility or had a medical procedure outside the U.S.

Infection prevention & control (IPC) actions to prevent the spread of a CPO**Perform Hand Hygiene:**

- When entering and exiting a room or environment
- Before and after task and handling medical devices
- Before donning and after doffing personal protective equipment
- Use soap and water when hands are visibly soiled

**Personal Protective Equipment (PPE):**

- Gown and gloves (mask and/or eye protection depending on anticipated exposure)
- Correct sequence for donning, doffing, and disposal
- Accessible location of PPE
- Always change PPE between patients, residents, or clients

**Environmental Cleaning and Disinfecting:**

- Use EPA-registered disinfectant effective against CPO, follow product instructions for use, and adhere to contact time
- Clean high-touch surfaces at least daily (including sinks, faucets, and countertops)
- Proceed from clean to dirty in a systematic manner
- Clean and disinfect shared medical equipment between each use

**Transmission-Based Precautions:**

- Post precaution signs
- Use Contact Precautions or Enhanced Barrier Precautions for long-term care facilities per facility policy
- Use Contact Precautions for acute care settings

**Plumbing:**

- Avoid discarding beverages/nutrient sources in sinks or toilets
- Keep patient/resident/client care items at least three feet away from sinks, toilets, and hoppers
- Do not discard patient/resident/client waste in sinks

**Additional Actions**

Dedicate medical equipment: When possible, dedicate medical equipment (e.g., blood pressure cuff, stethoscope) to patient/resident/client with colonization or with an infection of CPO.

Patient/resident/client placement: Private room, private bathroom when possible.

Resources for infection preventionists, administration, and leadership

Commonly detected Carbapenemase with bacteria

Carbapenemase	Bacteria Commonly Detected
KPC	Enterobacterales (i.e., <i>Klebsiella</i> species, <i>E. coli</i> , <i>Enterobacter</i> species, <i>Citrobacter</i> species)
NDM	Enterobacterales (i.e., <i>Klebsiella</i> species, <i>E. coli</i> , <i>Enterobacter</i> species, <i>Citrobacter</i> species)
IMP	Morganellaceae (i.e., <i>Providencia rettgeri</i> , <i>Proteus</i> species)
VIM	<i>Pseudomonas aeruginosa</i>
OXA-48	Enterobacterales (i.e., <i>Klebsiella</i> species, <i>E. coli</i> , <i>Enterobacter</i> species, <i>Citrobacter</i> species)
OXA-23, OXA-24, OXA-235, OXA-58	<i>Acinetobacter</i> species, <i>Acinetobacter baumannii</i> -CRAB

**Provide Education:**

- Update staff on patient/resident/client CPO infection/colonization status
- Educate all staff, volunteers, visitors, and patients/residents/clients
- Set clear facility expectations
- Use appropriate signage
- Identify and address language barriers

**Ensure Access to Resources:**

- Have PPE accessible, stocked, and organized
- Receptacle(s) available for used PPE
- Appropriately placed alcohol-based hand sanitizer (ABHS)
- Available cleaning and disinfection products

**Audit and Access:**

- Audit staff compliance on hand hygiene, PPE, environmental cleaning and wound care
- Provide feedback to staff during audit
- MDH ICAR Audit Tools (www.health.state.mn.us/facilities/patientsafety/infectioncontrol/icar/res/audit.html)

**Transport:**

- Notify internal/external staff or facility on current CPO infection/colonization status
- Inform medical transport services to use Contact Precautions
- Use appropriate PPE, perform hand hygiene, and clean and disinfect equipment

Contact Us:

MDH Infection Control Assessment and Response (ICAR) Team: Health.ICAR@state.mn.us

MDH HAI/AR Epi Team: health.hai@state.mn.us

Resources:

- **CDC Antimicrobial Resistance & Patient Safety Portal: Carbapenem-Resistant Enterobacterales** (<https://tinyurl.com/3bzu5wfw>)
- **Containment Checklist for Carbapenemase-Producing Organisms For Long-term Care Facilities** (www.health.state.mn.us/diseases/cre/hcp/rec.pdf)
- **CDC: Inter-Facility Infection Control Transfer Form for States Establishing HAI Prevention Collaboratives** (www.cdc.gov/healthcare-associated-infections/media/pdfs/Interfacility-IC-Transfer-Form-508.pdf)