

# Infection prevention resource impact to screen patients exposed to carbapenemase-producing organisms while admitted to a tertiary acute care hospital

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## PURPOSE

1. Describe the actions necessary for infection preventionists to coordinate a screening event in response to admitted patients possibly exposed to a carbapenemase-producing organism (CPO).
2. Recognize the challenges associated with coordinating a CPO exposure screening event.
3. Assess your own facility's readiness to respond to a request to coordinate a CPO exposure screening event.

## HOSPITAL DESCRIPTION

- Abbott Northwestern Hospital (ANW) is a large, Magnet-recognized tertiary care hospital in Minneapolis, MN. It is one of 10 hospitals in the Allina Health system.
  - 640 operational beds, typical daily census ~580
  - Infection Prevention (IP) team = 6
  - Consists of 3 critical care and 6 med/surg units, along with neuro, orthopedic, spine, telemetry, inpatient rehab, mental health, and mom-baby inpatient units

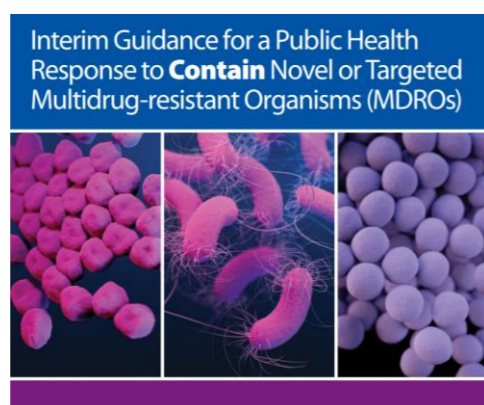


## BACKGROUND

- CPOs are a group of multidrug resistant pathogens classified by the Centers for Disease Control (CDC) as an urgent threat to public health. Their incidence is emerging.
- The Minnesota Department of Health (MDH) contacted our hospital on six separate occasions from August to November 2023 to request screening of admitted patients in response to potential CPO exposures.
  - Organisms involved in exposures: carbapenem-resistant *Acinetobacter baumannii* (CRAB), carbapenem-resistant *Pseudomonas aeruginosa* (CRPA), and *Serratia*.
  - Resistance genes included OXA 23 and 24, VIM (Verona integron-encoded metallo-β-lactamase), NDM (New Delhi metallo-β-lactamase), and KPC (*Klebsiella pneumoniae* carbapenemase).
  - Organism sources: wounds, urine, rectal
  - Risk factors identified among CPO patients admitted to our hospital: wounds, health care in international settings, and long-term care (LTC) residence.
- This was an unusually high number of requests for a 3-month period.

## METHODS

- MDH follows CDC recommendations for point prevalence screening for Tier 2 organisms, and Tier 3 organisms in certain circumstances.



- Requested screenings for each event:
  - All patients with overlapping stays on the same unit, prioritizing patients with significant risk factors (wounds, ventilated, LTC resident).
  - Patients with same wound care provider.
  - Patients in surgery after index patient.
- IP agreed to screen all patients still admitted that fit into the above categories with exception of those patients that were on contact precautions during dates of possible exposure.
- The electronic medical record (EMR) patient trace functionality was used to identify patients with overlapping stays.
- Additional chart review and outreach to leaders was done to ensure all potentially exposed patients were identified.
- IP went to units to distribute forms, swabs, and collection instructions.
  - Organized huddles with staff.
  - Spoke directly to few patients, only on an as-needed basis.
- Rectal swabs were collected for all CPO organisms
  - Patients were allowed to self-collect when possible, if that convinced them to screen.
  - Additionally, wound cultures were collected for CRAB only.

## FINDINGS

- All together these screening events involved ordering 115 microbiology screening cultures from 68 patients.
- The number of patients screened per event ranged from 7 to 15.
- Fourteen inpatient units and up to six units per screening event were involved.
- A vascular surgery unit was the unit most frequently involved in the screening events.
- All screening cultures collected were negative for the CPOs of interest in the exposures.
- For these six screening events, a total of approximately 68 hours of IP time was required.
  - This equates to roughly 1-hour of IP time per patient screened
  - This time estimate does not account for:
    1. The time spent for patients not screened, as some patients refused screening or discharged by the time screening was arranged.
    2. Nurse time to counsel and gain consent from patients.
    3. Hospital lab time coordinating testing and manual results entry from state public health lab.

## APPLICATION TO PRACTICE

- IP time needed for exposure investigations is large and the response is time-sensitive.
- Extensive time was needed due to the initial assessment required to identify exposed patients, preparation of screening materials, ordering the tests, communicating with bedside leadership and staff, interdepartmental collaboration, and distribution of the screening materials.
- Response included IP, environmental services, and unit staff partnership to conduct deep clean of entire vascular surgery unit.
  - This included privacy curtain changes and additional disinfection of shared patient equipment and unit high-touch surfaces.
- Limitations with the screening approach:
  - Many patients go unscreened due to the natural delay in identification, patient refusal, and discharge.
  - There is not a scientifically demonstrated time-period in which an exposed person becomes colonized and will subsequently test positive.
    - It is unclear that zero positive screening tests equates to absence of transmission.
- Continued collaboration is needed between acute care and state health departments to streamline requested screenings.

Screening Events Details									
Event	Notification date	MDRO of interest	Resistance gene	Source of MDRO+	Risk factors	# patients screened	Total screens	# positive screens	Approx IP time, hrs
1	8/24/23	CRAB	OXA24	Sacral wound	LTC with frequent wound care	14	31	0	18
2	9/21/23	CRAB	OXA23	Leg wound	Wound care in Thailand	9	23	0	10
3	9/22/23	CRPA	VIM	Urine	None identified	15	15	0	8
4	9/26/23	CRAB	OXA24	Rectal	International travel 2017 Identified from screening event from row 2. Spent time on vascular surgery unit - as did pt from row 1 also with OXA24. Did not overlap same time on unit.	12	28	0	16
5	10/5/23	CRAB	NDM	L foot I&D	Wound care in Thailand. Additional screening event because new NDM identified while admitted	7	7	0	10
6	11/16/23	<i>Serratia</i>	KPC	Urine	4 continuous months admitted to either TCU or hospital	11	11	0	6
<b>Total</b>	<b>3 month span</b>					<b>68</b>	<b>115</b>	<b>0</b>	<b>68 hours</b>

## SCREENING TASKS CHECKLIST FOR IPs

1	Determine exposure period for confirmed positive patient (e.g., time when not on precautions while potentially infectious or as directed by public health department).
2	Identify currently admitted patients potentially exposed to positive patient.
3	Consider placing into contact precautions higher risk exposed patients (e.g., shared room with confirmed positive case).
4	Notify unit leadership of patient exposures and next steps.
5	Notify nurses caring for the targeted patients regarding screening.
6	Place order in EMR for surveillance swabs to be collected.
7	Obtain surveillance swabs and fill out paperwork for health department as needed.
8	Deliver to nurses the collection swabs, lab submission forms, patient education, and collection instructions.
9	Nurses perform surveillance swab collection for exposed patients.
10	Respond to patient questions as requested.
11	Send patient line list to health department and monitor for results.
12	Alert staff regarding any positive test results, and place confirmed cases in Contact precautions.

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**REFERENCE**  
 CDC's Interim Guidance for a Public Health Response to Contain Novel or Targeted Multidrug-resistant Organisms (MDROs). Updated December 2022.