

Carbapenemase-Producing, Carbapenem-Resistant Enterobacteriaceae (CP-CRE) 2018 Annual Surveillance Report

CP-CRE Reporting

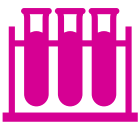
As of January 1, 2018, carbapenemase-producing, carbapenem-resistant Enterobacteriaceae (CP-CRE) became a reportable communicable disease condition in the state of Michigan. Physicians, laboratories, and other authorized healthcare professionals must report CP-CRE cases to the Michigan Disease Surveillance System (MDSS) or the local health department according to the CP-CRE case criteria.

CP-CRE Case Criteria:



- Healthcare record contains a diagnosis of CP-CRE, or any of the following carbapenemase genes in *Klebsiella* spp., *Escherichia coli*, or *Enterobacter* spp.:
 - *Klebsiella pneumoniae* carbapenemase (KPC)
 - New Delhi metallo- β -lactamase (NDM)
 - Verona integron encoded metallo- β -lactamase (VIM)
 - Imipenemase metallo- β -lactamase (IMP)
 - Oxacillinase-48 type carbapenemase (OXA-48)
 - Other novel carbapenemase gene
- Any isolate of *Klebsiella* spp., *E. coli*, or *Enterobacter* spp. demonstrating carbapenemase production by a phenotypic method (e.g., Carba-NP, modified carbapenemase inactivation method (mCIM))
- Any isolate of *Klebsiella* spp., *E. coli*, or *Enterobacter* spp. with a known carbapenem resistance gene by a recognized test (e.g., PCR, Carba-R)
- If laboratories are unable to detect CP-CRE (i.e., cannot test for carbapenemase production or carbapenem resistance genes), report:
 - Any isolate of *Klebsiella* spp., *E. coli*, or *Enterobacter* spp. with a minimum inhibitory concentration (MIC) of ≥ 4 $\mu\text{g/mL}$ for doripenem, imipenem, or meropenem, or ≥ 2 $\mu\text{g/mL}$ for ertapenem

Isolate Submission:



Isolates of CP-CRE are **requested to be submitted** to the MDHHS Bureau of Laboratories Lansing laboratory for confirmatory testing. This testing includes confirmation of identification, mCIM for detection of carbapenemase production, PCR for KPC, NDM, VIM, IMP, and OXA-48 carbapenemase genes, and antimicrobial susceptibility testing.

Case Classification:



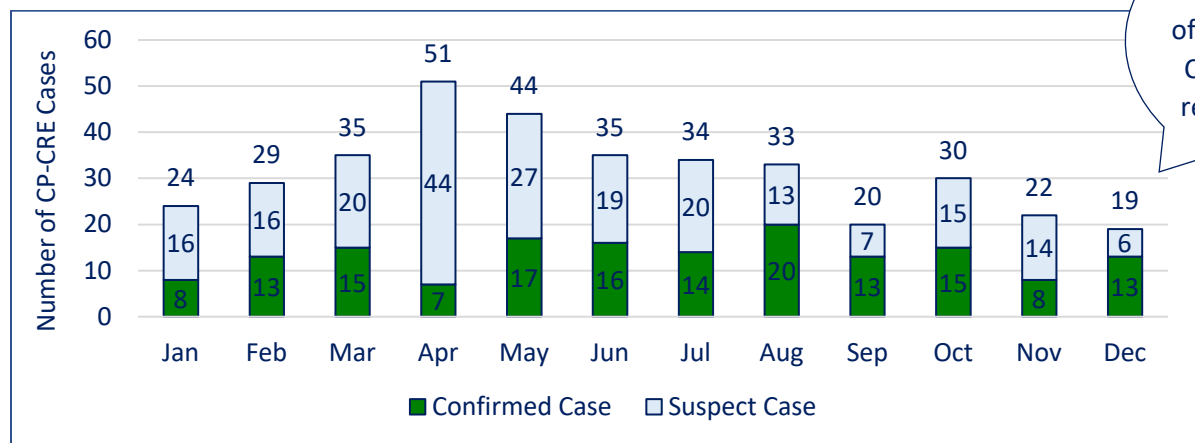
CP-CRE cases are classified as either confirmed or suspect cases as follows:

- **Confirmed:** *Klebsiella* spp., *E. coli*, or *Enterobacter* spp. demonstrating carbapenemase production or a carbapenemase resistance gene
- **Suspect:** *Klebsiella* spp., *E. coli*, or *Enterobacter* spp. demonstrating resistance to 1 or more carbapenem antibiotics when no phenotypic or genetic testing for carbapenemases was performed

Surveillance Data

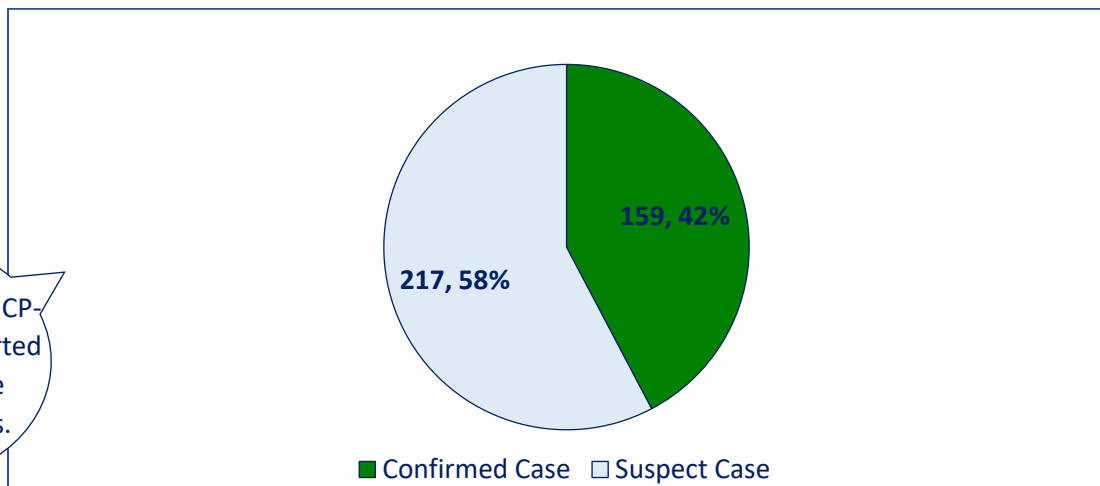
This report summarizes the CP-CRE cases reported to MDSS or local health departments with specimen collection or onset dates between January 1st and December 31st, 2018. Case data was extracted from MDSS on March 6, 2019.

Figure 1. CP-CRE Cases Reported into MDSS by Month, 2018



In 2018, a total of 376 cases of CP-CRE were reported into MDSS.

Figure 2. CP-CRE Cases by Case Status, 2018



The majority of CP-CRE cases reported in 2018 were suspect cases.

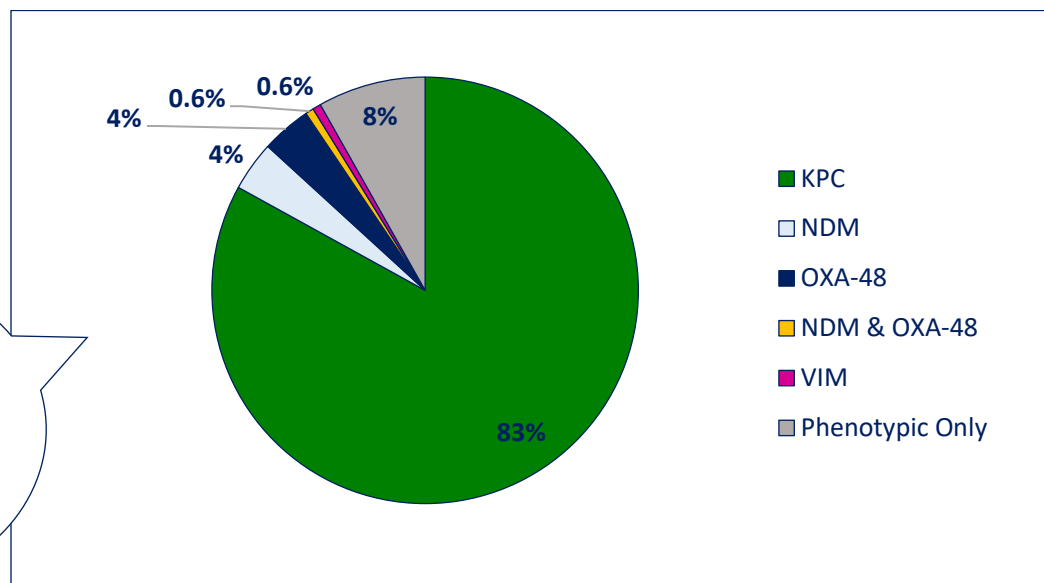
Klebsiella spp.,
 comprised 53% of all
 cases reported and
 69% of confirmed
 cases.

Table 1. CP-CRE Cases by Organism and Case Classification, 2018

Organism	CP-CRE Cases		
	Confirmed n=159	Suspect n=217	Total n=376
<i>Klebsiella</i> spp.	110 (69)	89 (41)	199 (53)
<i>Klebsiella pneumoniae</i>	102 (64)	68 (31)	170 (45)
<i>Klebsiella aerogenes</i>	4 (3)	14 (6)	18 (5)
<i>Klebsiella oxytoca</i>	3 (2)	7 (3)	10 (3)
<i>Klebsiella variicola</i>	1 (1)	0 (0)	1 (0)
<i>Escherichia coli</i>	23 (14)	69 (32)	92 (42)
<i>Enterobacter</i> spp.	26 (16)	59 (27)	85 (23)
<i>Enterobacter cloacae</i>	26 (16)	57 (26)	83 (22)
<i>Enterobacter asburiae</i>	0 (0)	1 (0)	1 (0)
<i>Enterobacter hormaechei</i>	0 (0)	1 (0)	1 (0)

Data in table are count (column percent) unless otherwise noted.

Figure 3. Confirmed CP-CRE Cases by Resistance Mechanism, 2018



Most confirmed CP-CRE cases harbored a KPC gene (132, 83%). However, 14 cases harbored a novel resistance gene (9%).

Figure 4. CP-CRE Cases by County of Residence, 2018

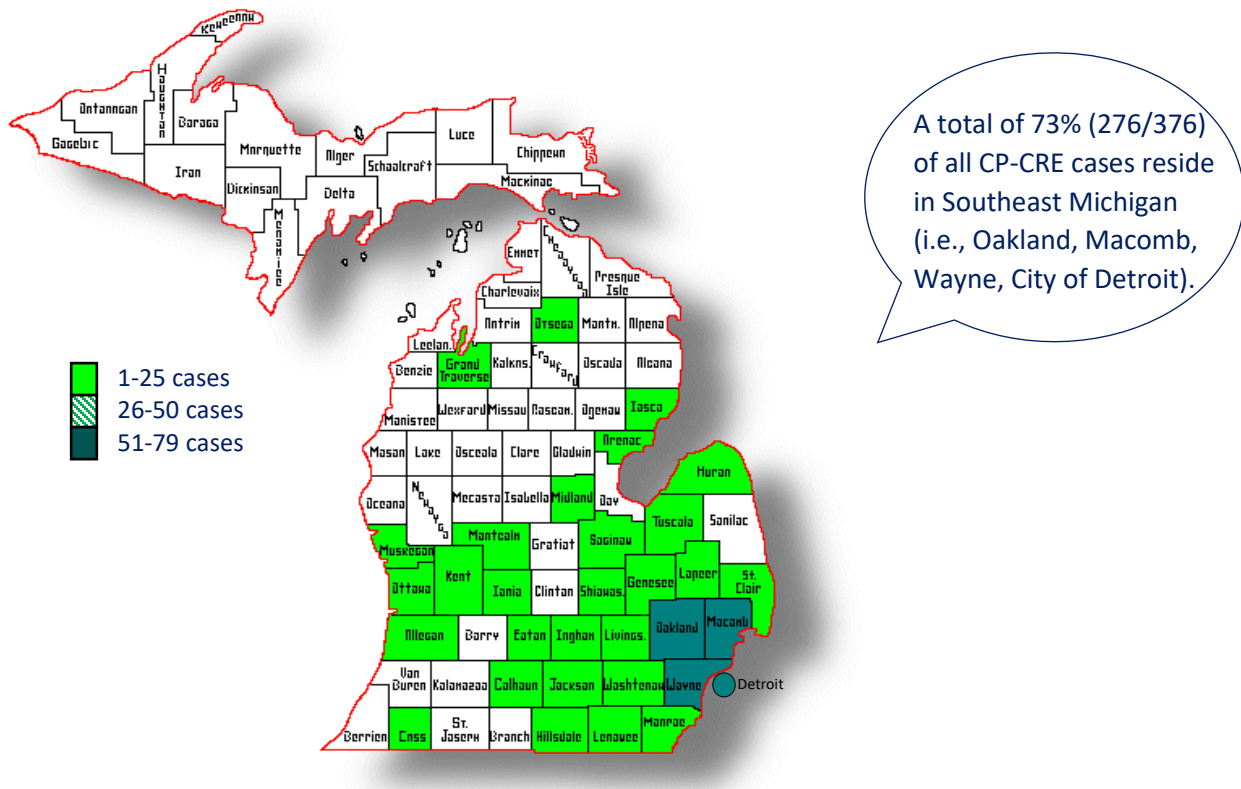
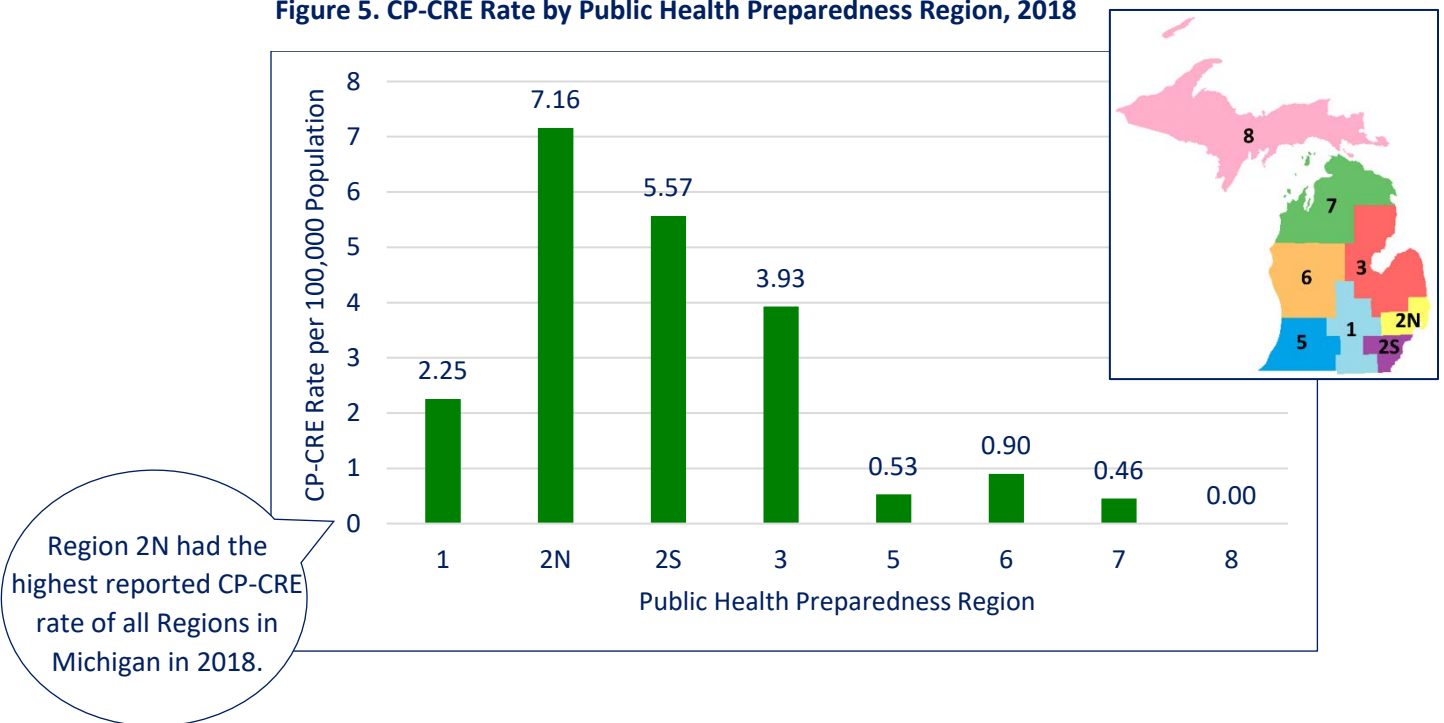


Figure 5. CP-CRE Rate by Public Health Preparedness Region, 2018





CP-CRE Case Investigation



- Interim guidance for CP-CRE case reporting and investigation is available at: https://www.michigan.gov/documents/mdhhs/CP-CRE_Reporting_and_Investigation_Guidance_609954_7.pdf
- Cases of novel CP-CRE require more extensive investigation and follow-up. The Centers for Disease Control and Prevention’s Containment Strategy Interim Guidance is available at: <https://www.cdc.gov/hai/containment/guidelines.html>



MDHHS CP-CRE Resources

Laboratory Testing:



- The MDHHS Bureau of Laboratories offers isolate testing to clinical laboratories for antimicrobial resistance confirmation. Specimen submission information and test requisition forms are available at: www.michigan.gov/mdhhs/lab
- The MDHHS Bureau of Laboratories also offers CP-CRE colonization screening for epidemiologically linked patient contacts of newly identified CP-CRE cases, patients at high-risk for CP-CRE colonization, and those with an overnight stay in a healthcare facility outside the US in the last 6 months. Colonization screening can be arranged by contacting the MDHHS SHARP Unit at 517-335-8165.

Informational Materials:



- [CRE brochure \(general information\)](#)
- [CRE brochure for Patients and Family](#)
- Additional information available at: www.michigan.gov/hai

MDHHS SHARP Unit
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