

Carbapenem-Resistant Organisms/Carbapenemase-Producing Organisms - Surveillance Report

May 09, 2023



Figure 1: Carbapenem Resistant Enterobacterales, CDC.gov

**Healthcare-Associated Infections/Antimicrobial Resistance Program,
Epidemiology and Response Division, Infectious Disease Epidemiology Bureau,
New Mexico Department of Health**

Healthcare-Associated Infections and Antimicrobial Resistance (HAI/AR) Program Reporting

Healthcare-associated infections (HAI) are infections patients can acquire while receiving medical treatment. The New Mexico Department of Health (NMDOH) and New Mexico HAI Advisory Committee have facilitated statewide and regional HAI prevention efforts since 2008. NMDOH receives both voluntary and mandatory data from healthcare facilities via the National Healthcare Safety Network (NHSN) reporting system.

Antimicrobial resistance (AR) is an urgent global public health threat, killing at least 1.27 million people worldwide and associated with nearly 5 million deaths in 2019. In the U.S., more than 2.8 million antimicrobial resistant infections occur each year, and more than 35,000 people die as a result. Carbapenem resistant organisms (CRO) are categorized as urgent threats by CDC (CDC Antibiotic Resistance Threats in the United States, 2019). To address this threat, NMDOH works through CDC's AR Solutions Initiative to invest in national infrastructure to detect, respond, contain, and prevent resistant infections across healthcare settings, communities, the food supply, and the environment. For more information on the AR Solutions Initiative, please visit <https://www.cdc.gov/drugresistance/solutions-initiative/index.html>.

Carbapenem-resistant Enterobacterales (CRE) and Carbapenem-resistant *Pseudomonas aeruginosa* (CRPA) became notifiable conditions with required isolate submission to the state public health lab in New Mexico in 2016.

Carbapenem-Resistant Organisms (CRO)

Enterobacterales are a large order of different types of germs (bacteria) that commonly cause infections in healthcare settings. Examples of germs in the Enterobacterales order include *Escherichia coli* (E. coli) and *Klebsiella pneumoniae*.

Antibiotic resistance occurs when the germs no longer respond to the antibiotics designed to kill them. Enterobacterales bacteria are constantly finding new ways to avoid the effects of the antibiotics used to treat the infections they cause.

When Enterobacterales develop resistance to the group of antibiotics called carbapenems, the germs are called carbapenem-resistant Enterobacterales (CRE).

CRE are difficult to treat because they do not respond to commonly used antibiotics. Occasionally CRE are resistant to all available antibiotics, making it a threat to public health.

Carbapenem resistant *Acinetobacter baumannii* (CRAB) can cause infections in the blood, urinary tract, lungs, and in wounds. It can also colonize a patient without causing infections or symptoms, especially in the respiratory secretions or open wounds. Unfortunately, many *Acinetobacter* germs are resistant to many antibiotics, including carbapenems, which makes them difficult to treat with available antibiotics. In the US, CRAB infections rarely occur outside healthcare settings, people most at risk include those who:

- are on breathing machines (ventilators)
- have devices such as catheters
- have open wounds from surgery
- are in intensive care units
- have prolonged hospital stays

Acinetobacter can live for long periods of time on environmental surfaces and shared equipment if they are not properly cleaned. The germs can spread from one person to another through contact with these contaminated surfaces or equipment or through person to person spread, often via contaminated hands.

Carbapenem resistant *Pseudomonas aeruginosa* (CRPA) can cause infections in the blood, lungs, and other parts of the body following surgery. CRPA can develop resistance to several types of antibiotics and can become multidrug-resistant or even pan-resistant. Those most at risk include patients in hospitals, especially those:

- on breathing machines (ventilators)
- with devices such as catheters
- with wounds from surgery or burns

Pseudomonas aeruginosa lives in the environment and can be spread to people in healthcare settings when they are exposed to water that is contaminated with these germs. Resistant strains of the germ can also spread in healthcare settings from one person to another through contaminated hands, equipment, or surfaces.

Carbapenemase-Producing Organisms (CPO)

Carbapenemase-Producing Organisms (CPO) are multidrug-resistant gram-negative bacteria, such as *Klebsiella*, *Escherichia coli* (E.coli), *Acinetobacter* and *Pseudomonas*, that produce enzymes to inactivate carbapenems. CPO are resistant to all beta

lactam antibiotics and typically carry resistance genes to other classes of antibiotics as well. Infections with CPO are difficult to treat and associated with high mortality rates. Carbapenem antibiotics are often used as the last line of treatment for infections caused by highly resistant bacteria. Increased antimicrobial resistance limits treatment options. CPO contain mobile resistance elements that facilitate transmission of resistance to other Gram-negative bacilli. Early detection and aggressive implementation of infection prevention and control strategies are necessary to prevent further spread of CPO, especially novel CPO.

CPO can colonize in the gastrointestinal (GI) tract. Patients may be asymptomatic carriers of these organisms. When CPO spread outside of the GI tract, they can cause serious infections such as urinary tract infections, bloodstream infections and pneumonia. These infections are very difficult to treat as CPO are resistant to most antibiotics.

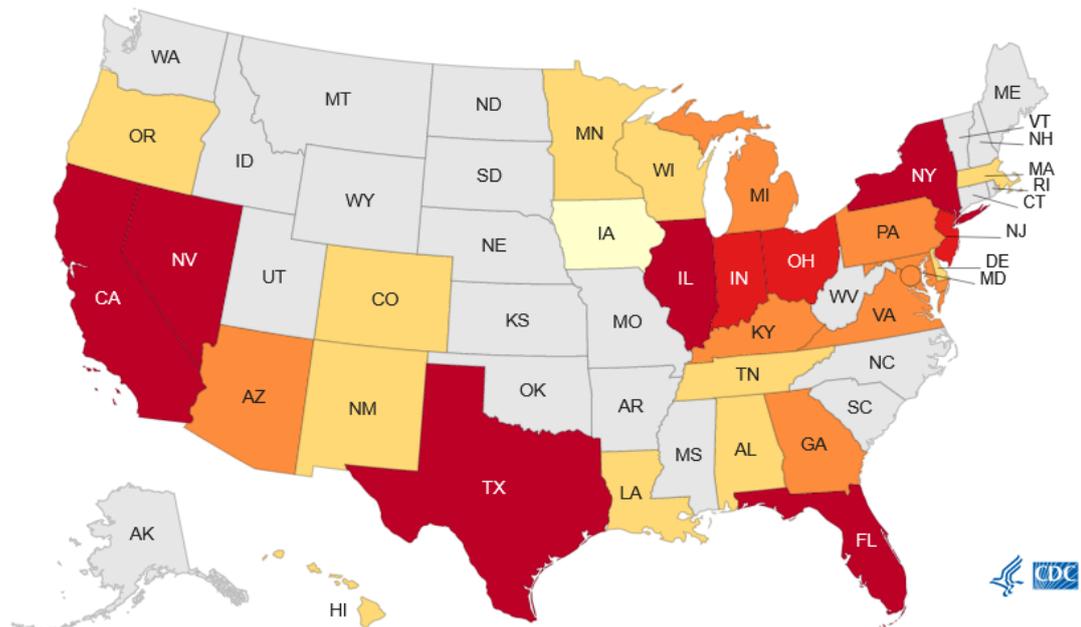
CPO are transmitted from person to person by direct and indirect contact. These organisms are most likely to be acquired through healthcare exposures related to poor hand hygiene and contaminated patient equipment. CPO prevalence is increasing worldwide, including in the United States.

The New Mexico Department of Health's HAI/AR Program began surveillance of CRO and CPO in 2015. This report summarizes the current data for New Mexico.

Candida auris

Candida auris (*C. auris*) is an emerging fungus that presents a serious global health threat. CDC's Mycotic Diseases Branch tracks the number of *C. auris* cases in the United States over time to assess the impact of prevention strategies and inform public health practices. In the United States, most cases of *C. auris* result from local spread within and among healthcare facilities in the same city or state. However, healthcare facilities should be on the lookout for new introductions of *C. auris* from patients who received healthcare elsewhere in the United States or abroad in areas with *C. auris* transmission.

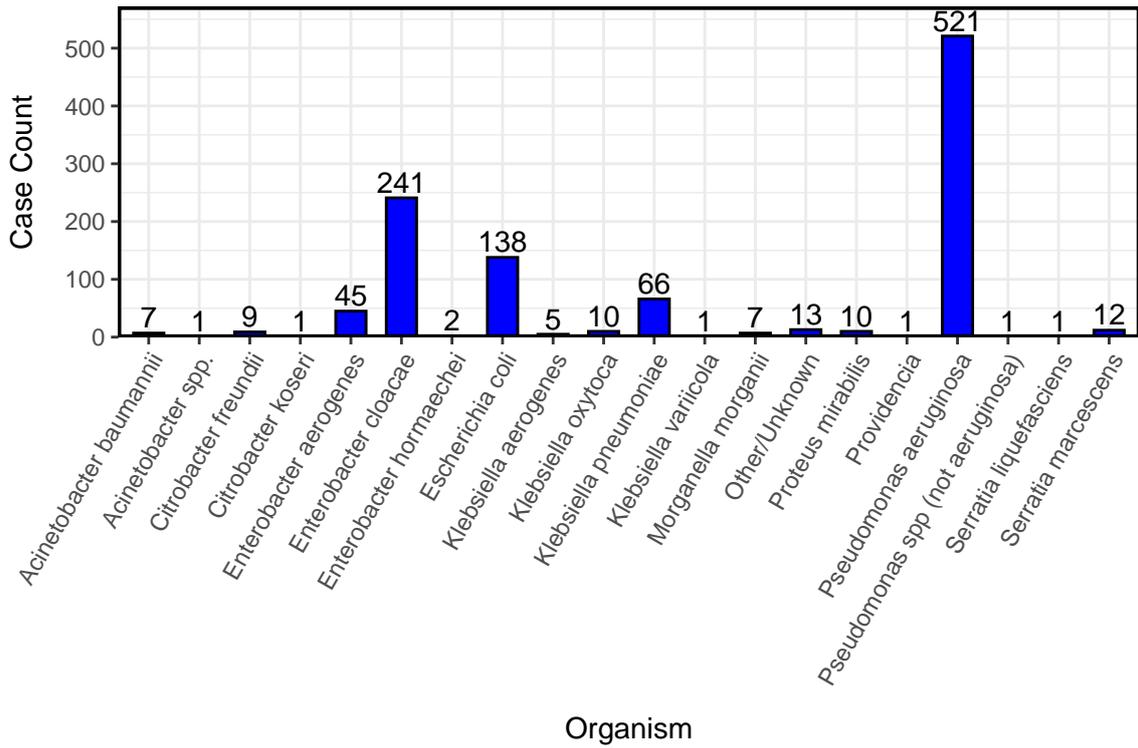
C. auris case counts are provided by local and state health departments to the CDC every month, and are summarized in the map below and include *C. auris* cases from 2013, the year of the earliest known U.S. case. In August of 2022, NMDOH identified the state's first clinical case of *C. auris* in an adult with multiple inpatient and skilled nursing facility stays in Bernalillo County. Investigation and screening of potential healthcare contacts in these facilities found no additional cases; however, NMDOH continues to conduct surveillance of these organisms. This report will be updated if another case of *C. auris* is identified in New Mexico.



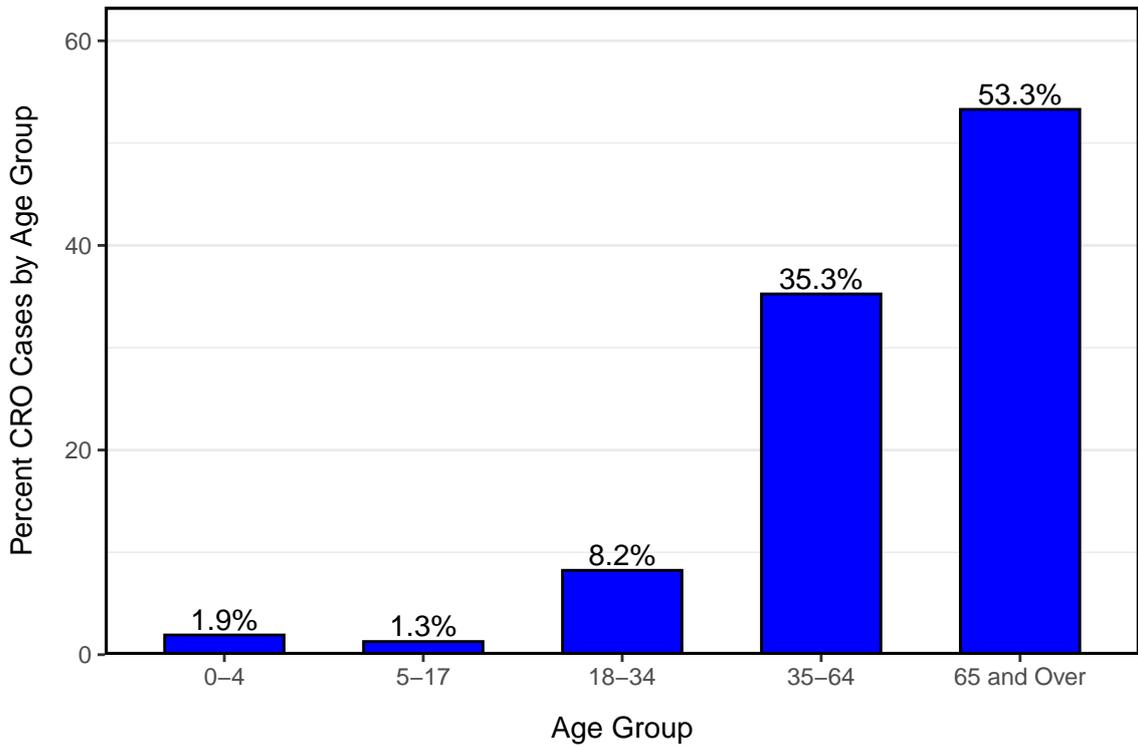
Number of *C. auris* clinical cases through November 30, 2022.

In the most recent 12 months, there were 2,314 clinical cases and 5,612 screening cases (December 2021 - November 2022).

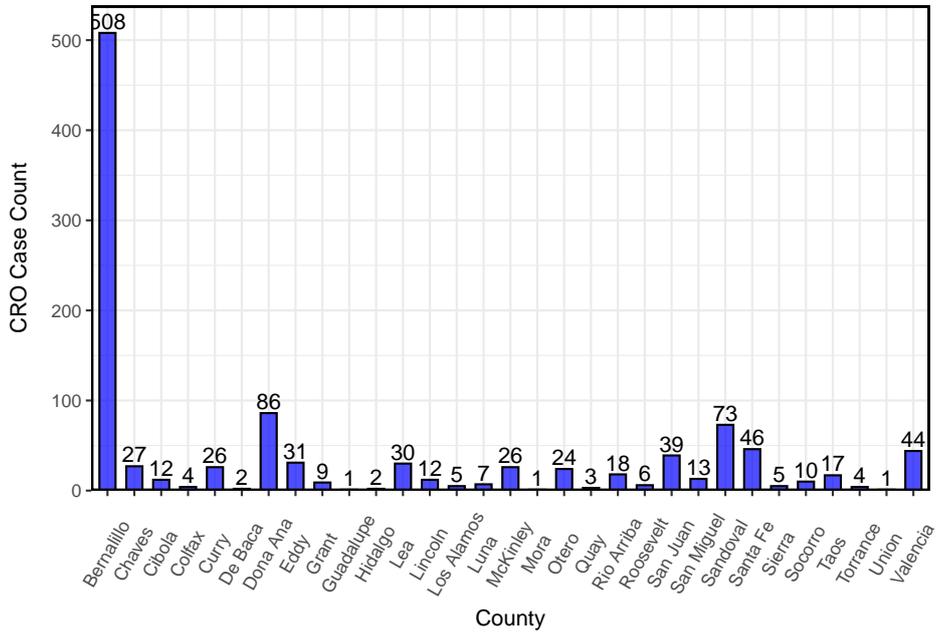
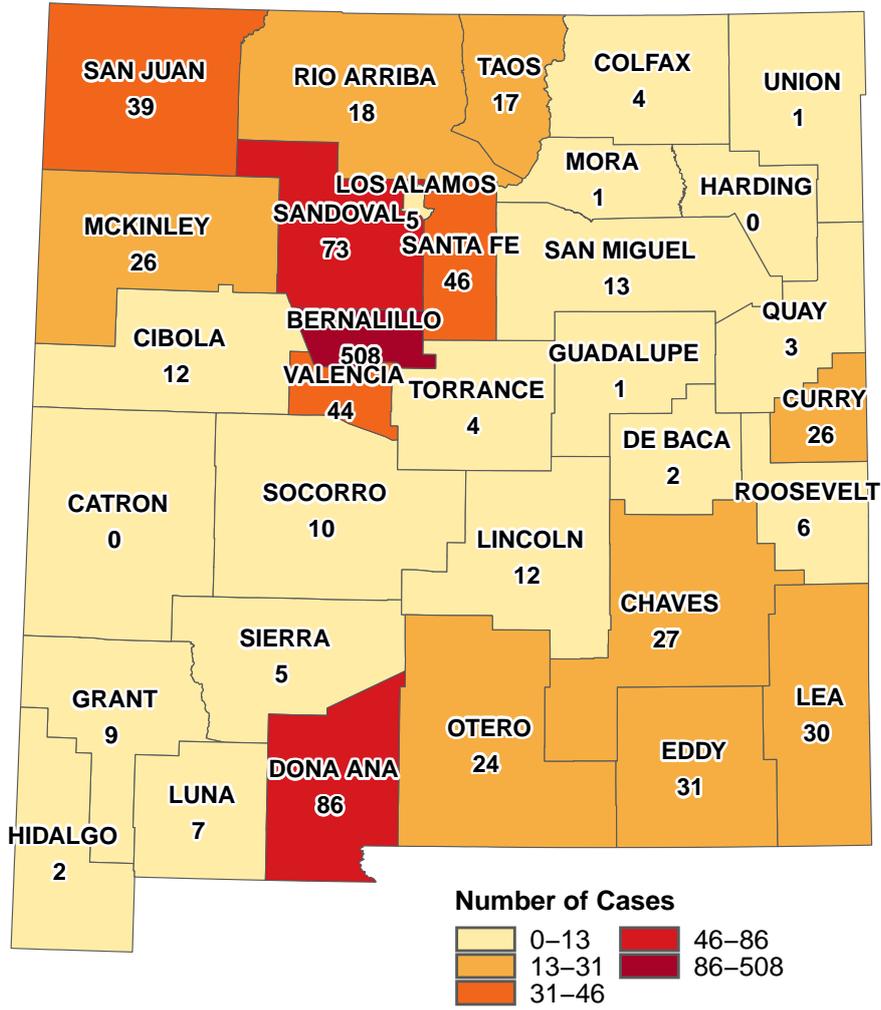
**Case Counts by Organism for CRO
(11/01/2015 - 05/09/2023)**



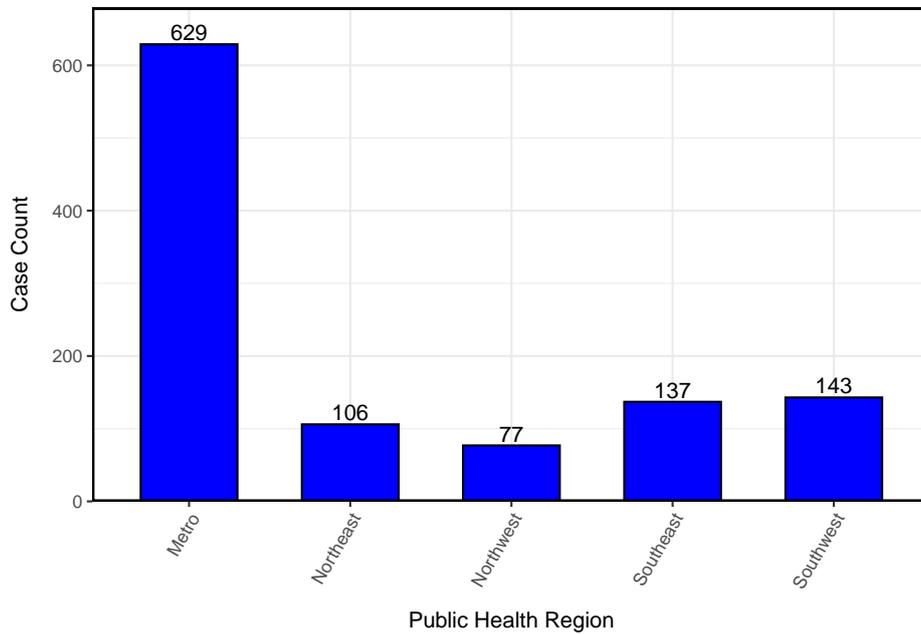
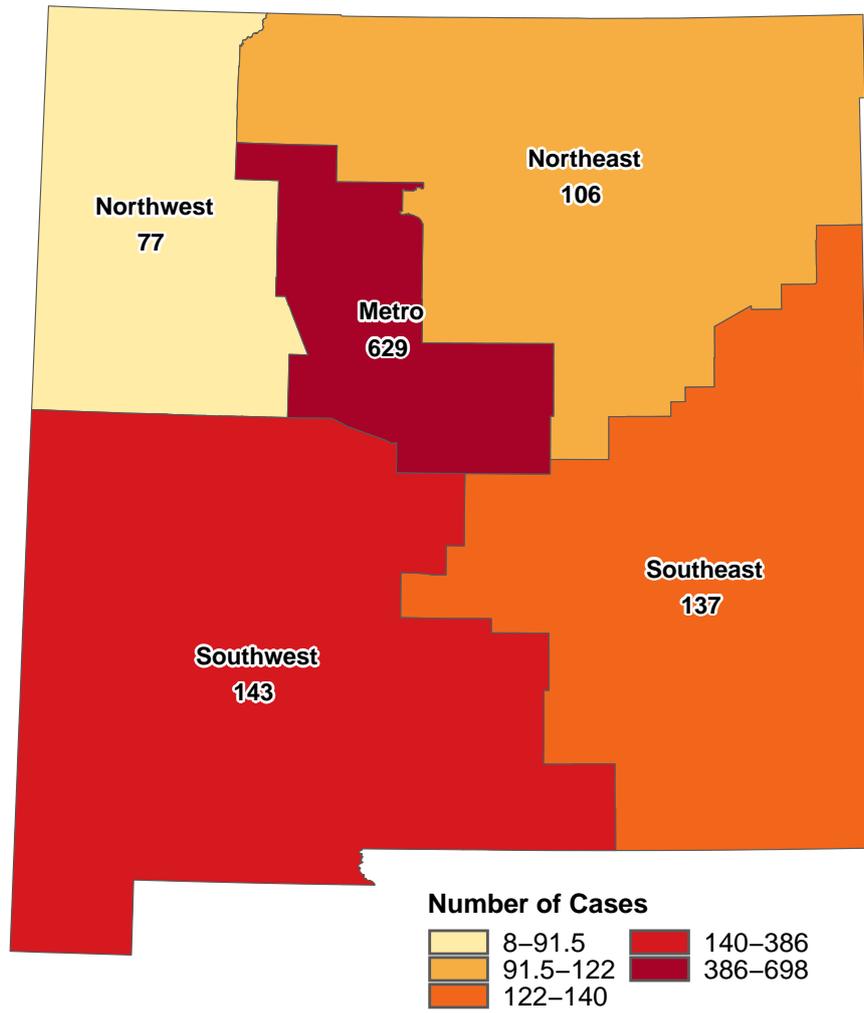
**Percent CRO Cases by Age Group
(11/01/2015 - 05/09/2023)**



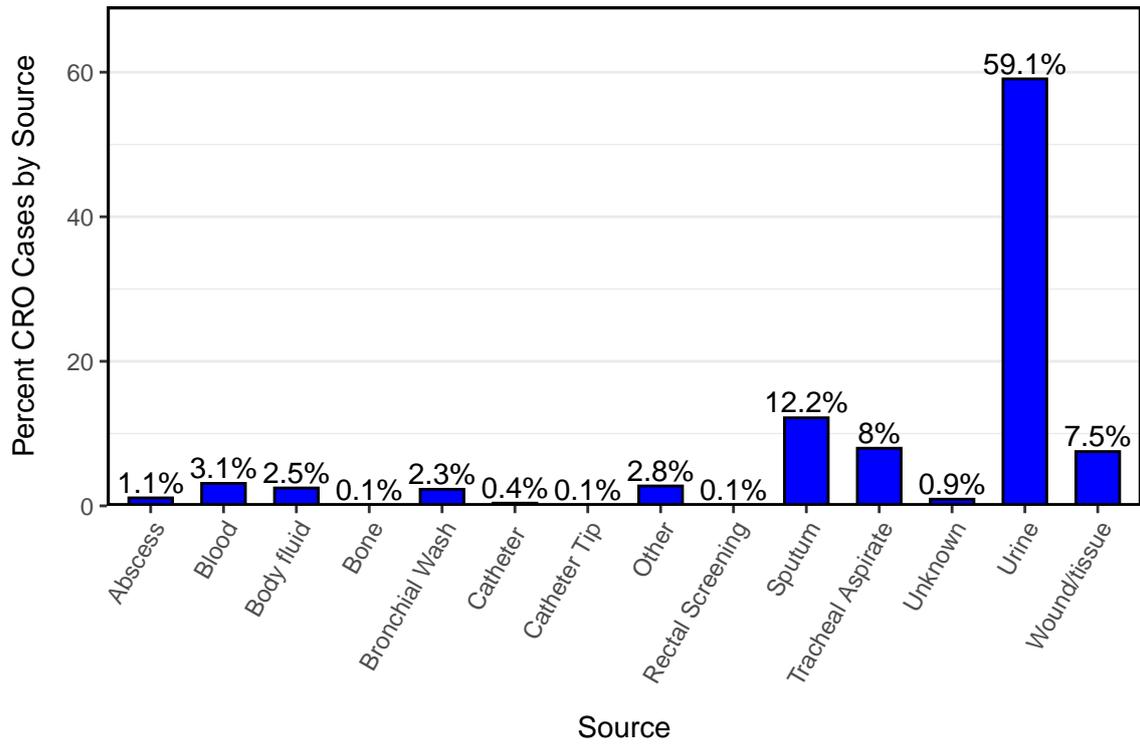
Map of CRO Counts by County of Residence (11/01/2015 - 05/09/2023)



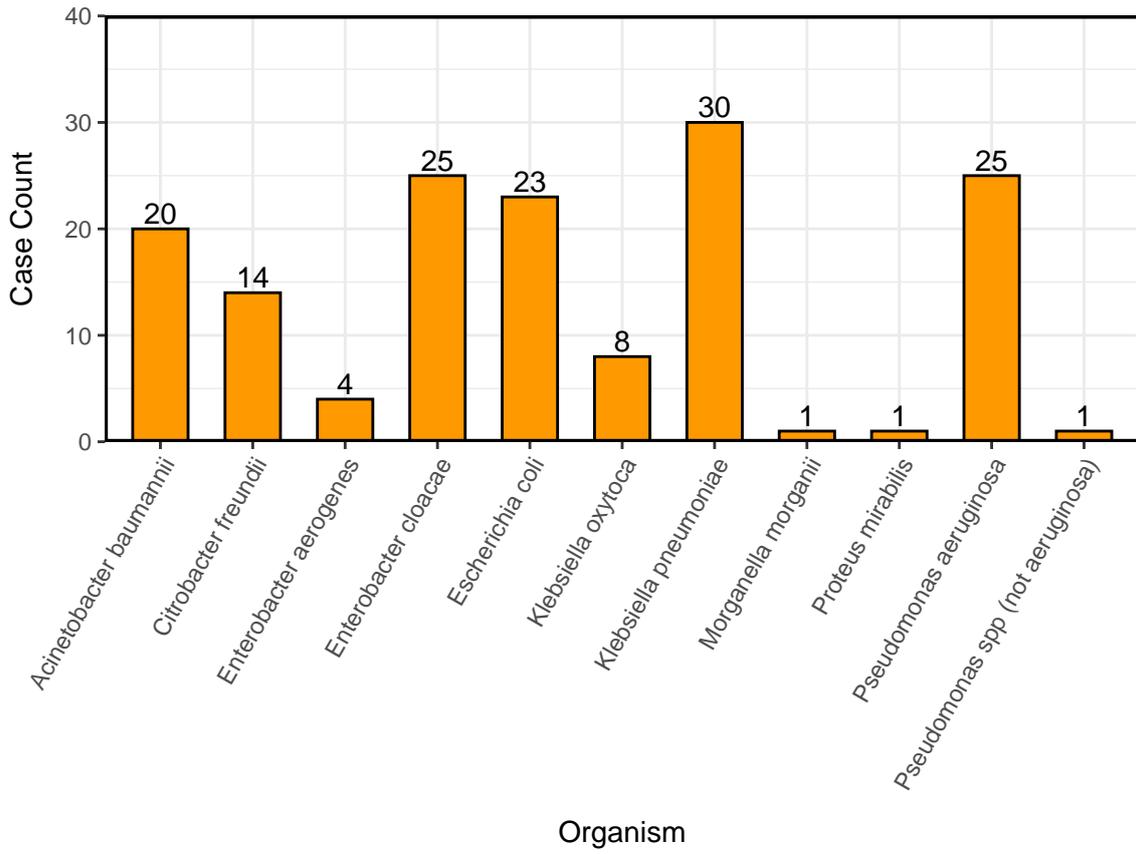
Map of CRO Counts by Public Health Region (11/01/2015 - 05/09/2023)



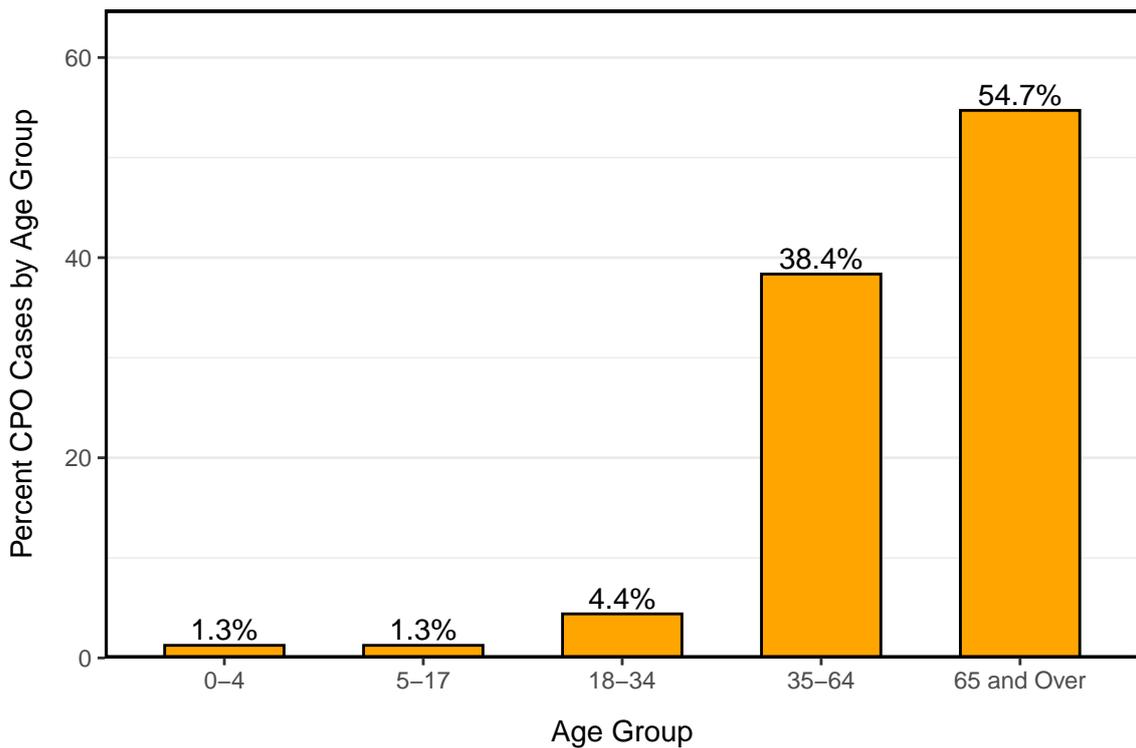
**Percent of CRO Cases by Specimen Source
(11/01/2015 - 05/09/2023)**



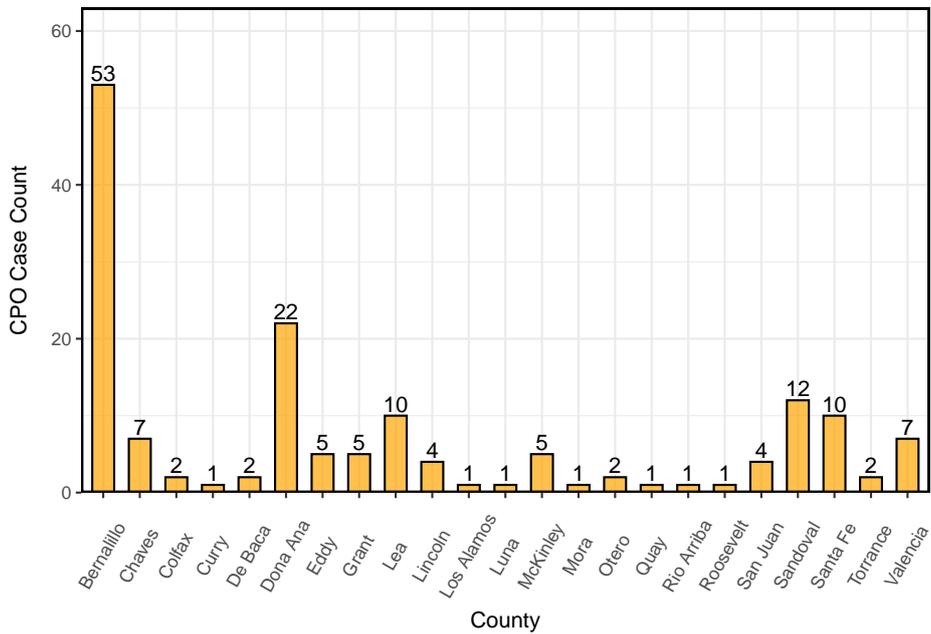
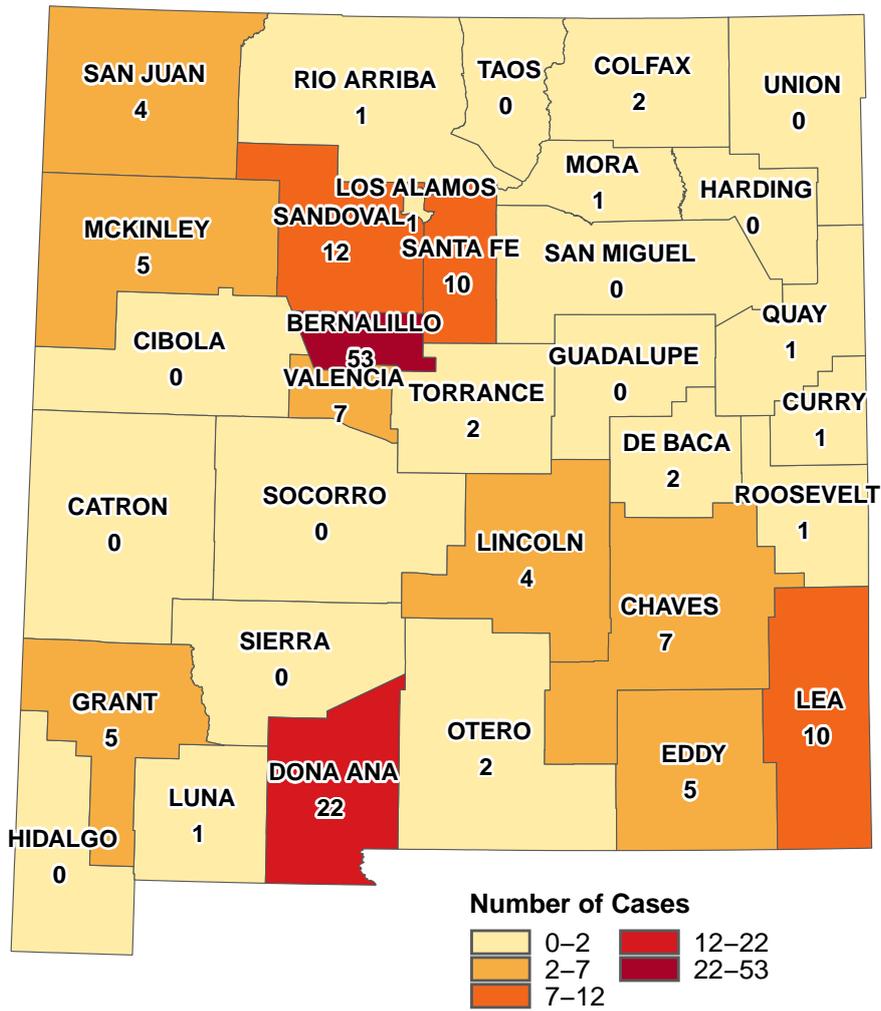
**Case Counts by Organism for CPO
(11/01/2015 - 05/09/2023)**



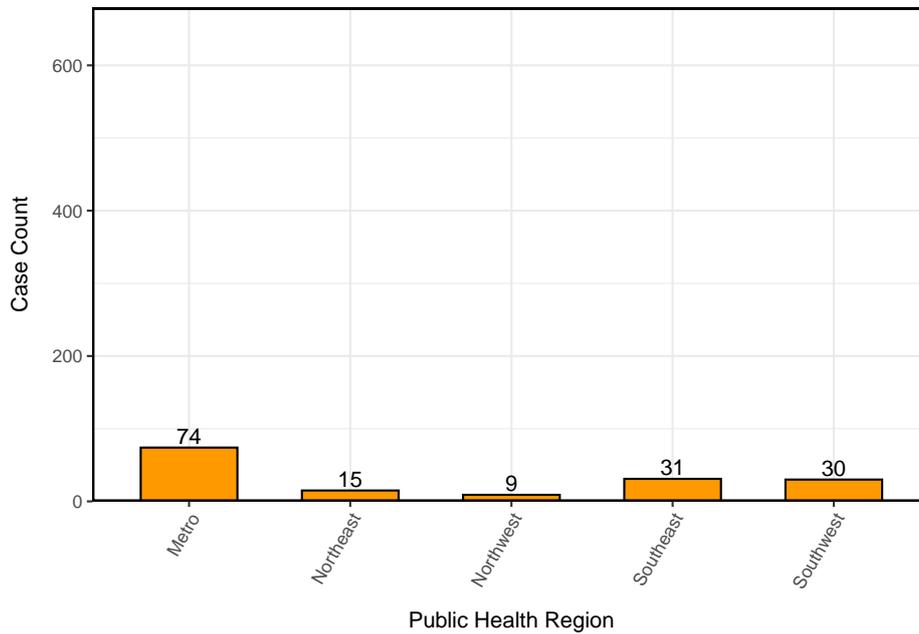
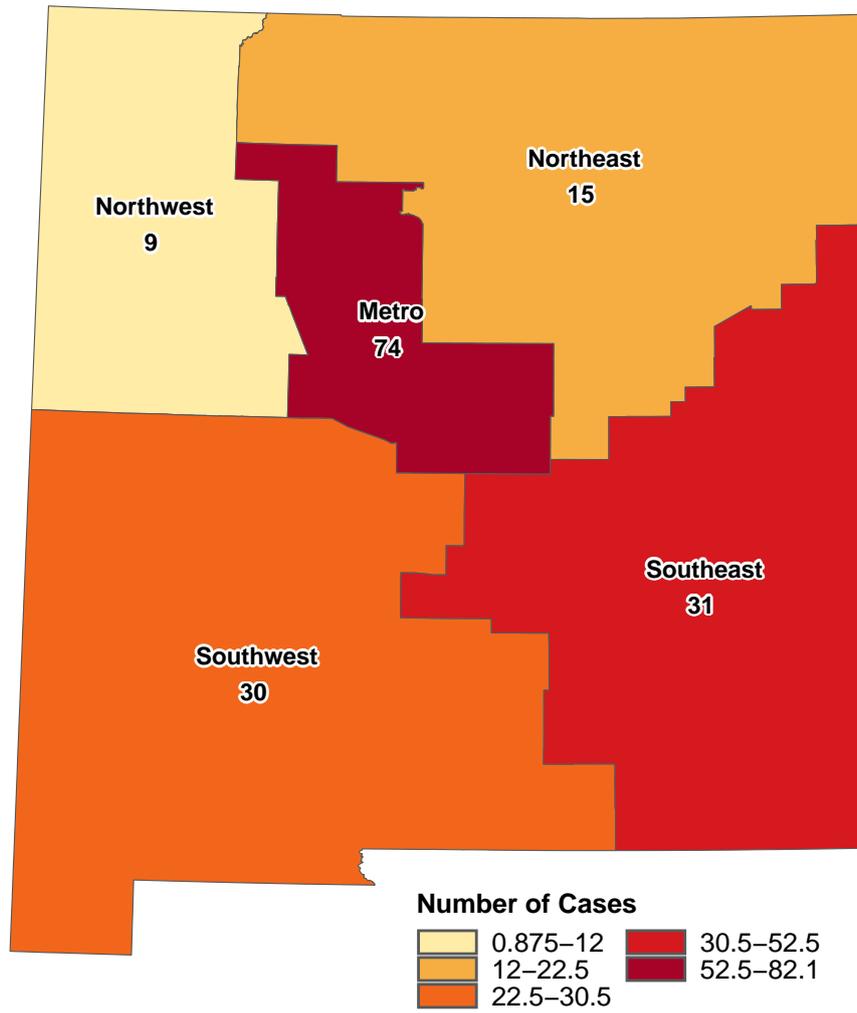
**Percent CPO Cases by Age Group
(11/01/2015 - 05/09/2023)**



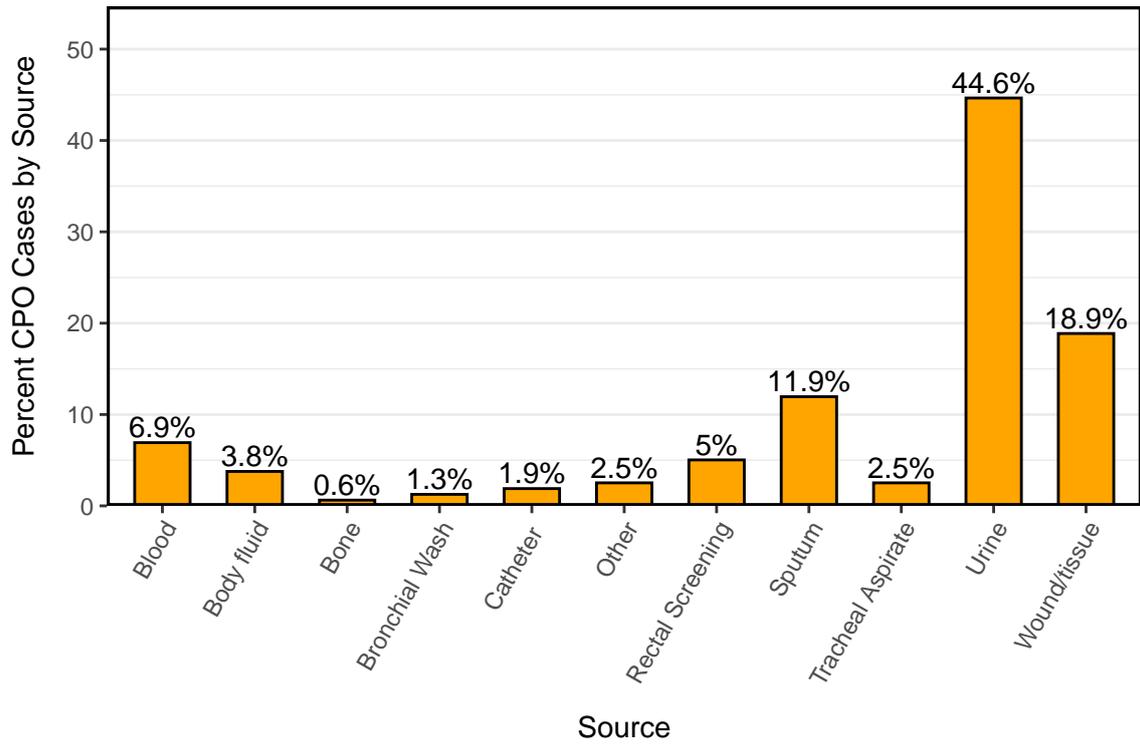
Map of CPO Counts by County of Residence (11/01/2015 - 05/09/2023)



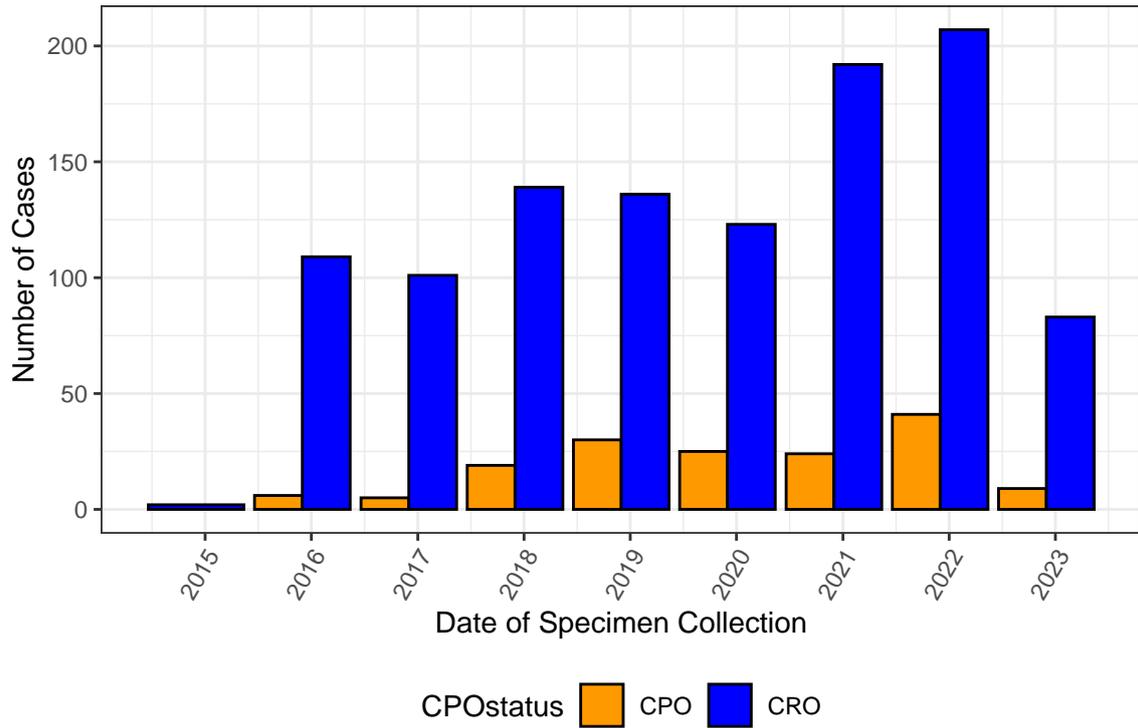
Map of CPO Counts by Public Health Region (11/01/2015 - 05/09/2023)



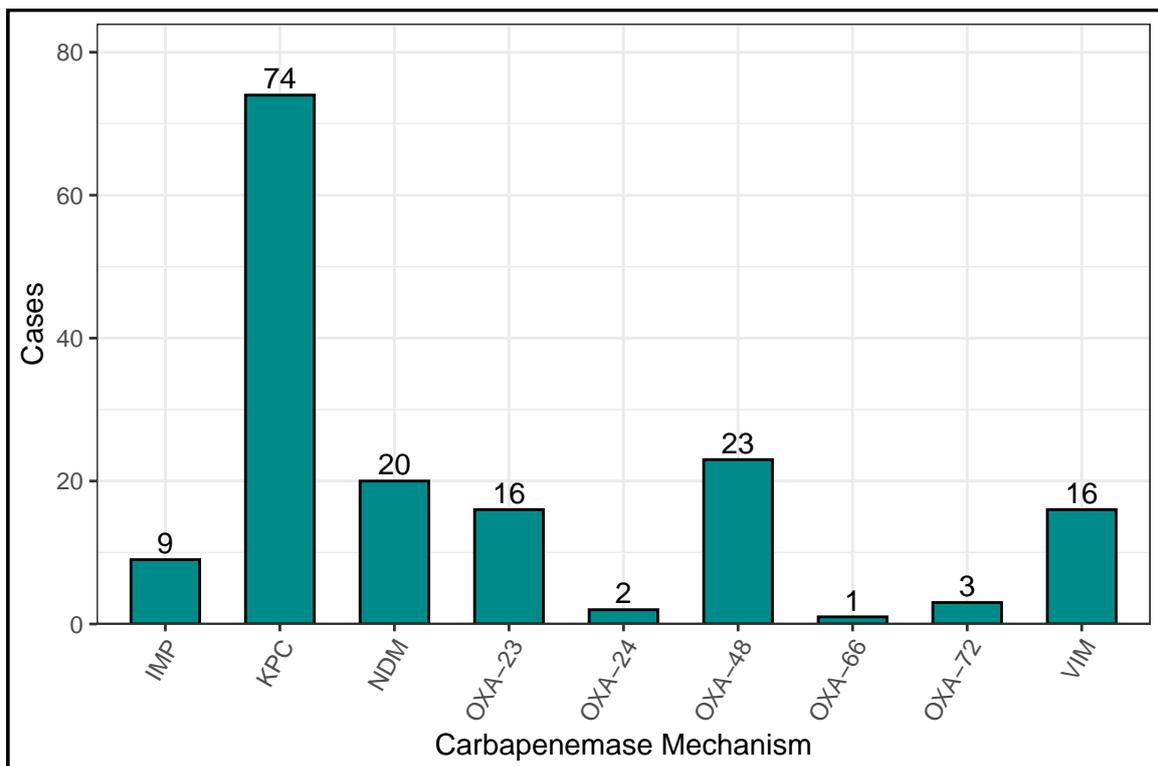
**Percent of CPO Cases by Specimen Source
(11/01/2015 - 05/09/2023)**



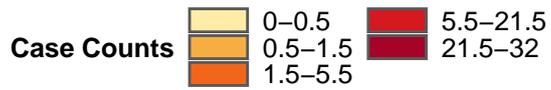
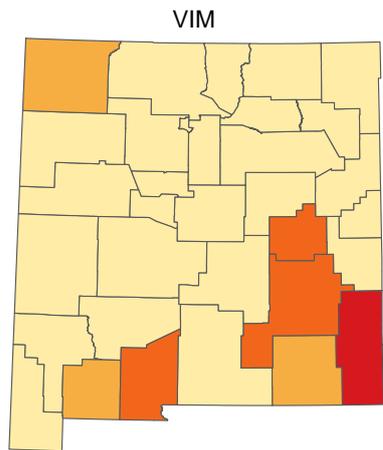
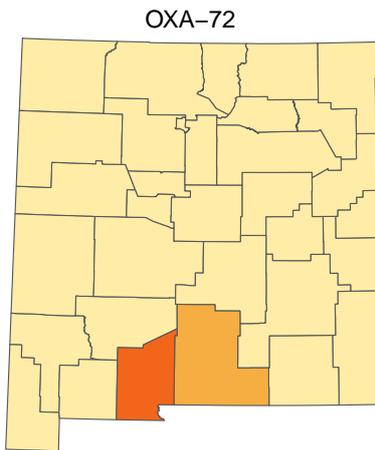
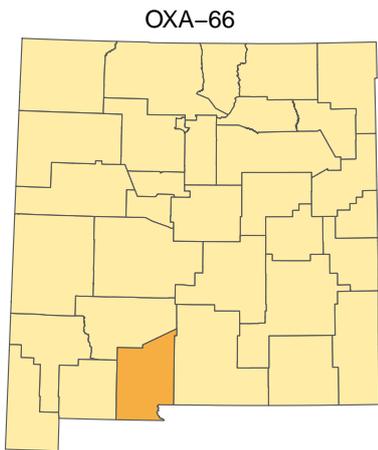
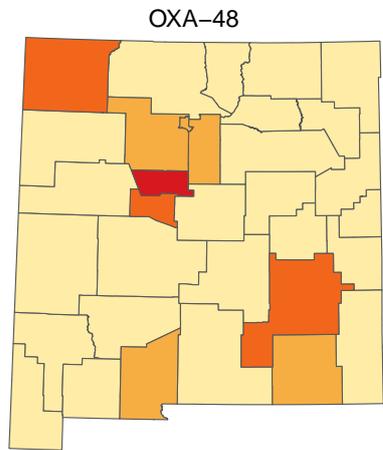
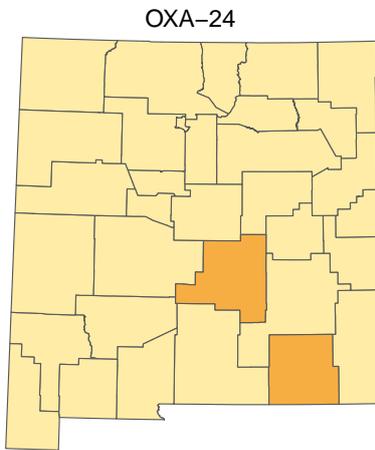
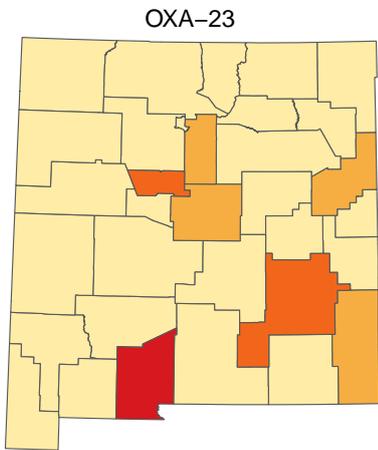
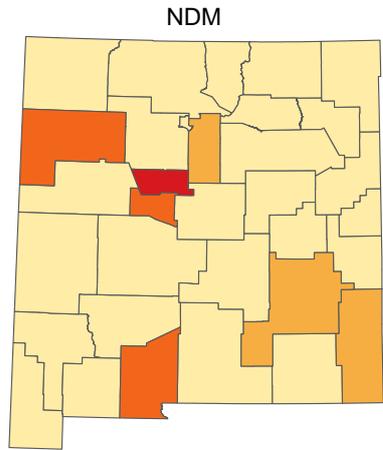
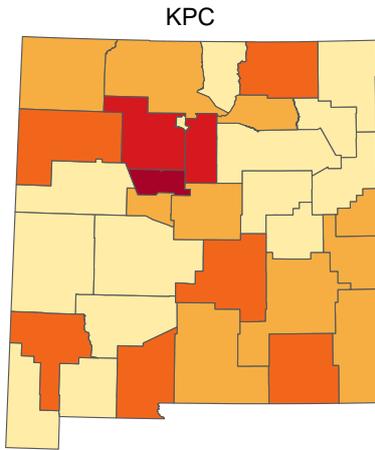
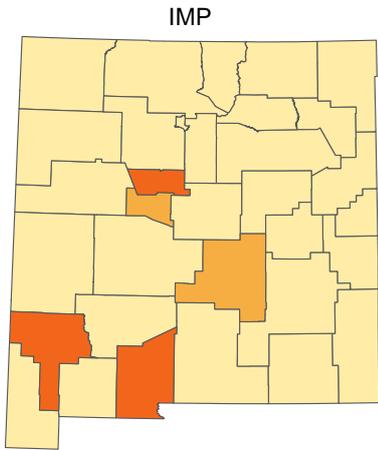
**CRO/CPO Case Counts by Year
(11/01/2015 - 05/09/2023)**



**CPO Case Counts by Carbapenemase Mechanism
(11/01/2015 - 05/09/2023)**



Carbapenemase Mechanism - Counts by County of Residence
(11/01/2015 - 05/09/2023)



Counts of Carbapenemase Mechanism by Organism
(11/01/2015 - 05/09/2023)

Organism	IMP	KPC	NDM	OXA-23	OXA-48	VIM
Acinetobacter baumannii	NA	NA	NA	15	1	NA
Acinetobacter spp.	0	0	0	0	0	0
Citrobacter freundii	0	14	1	0	0	0
Enterobacter aerogenes	0	3	0	0	1	0
Enterobacter cloacae	0	20	4	0	1	1
Escherichia coli	1	5	8	0	10	0
Klebsiella oxytoca	0	6	1	0	1	0
Klebsiella pneumoniae	0	21	6	0	3	0
Morganella morganii	0	1	0	0	0	0
Proteus mirabilis	1	0	0	0	0	0
Pseudomonas aeruginosa	7	2	0	1	2	13
Pseudomonas spp (not aeruginosa)	0	0	0	0	0	1

CDC's 2019 AR Threats Report: PREVENTION WORKS.

↓ 18% fewer deaths from antibiotic resistance overall since 2013 report

↓ 28% fewer deaths from antibiotic resistance in hospitals since 2013 report

AND DECREASES IN INFECTIONS CAUSED BY:

↓ 41% Vancomycin-resistant *Enterococcus*

↓ 33% Carbapenem-resistant *Acinetobacter*

↓ 29% Multidrug-resistant *Pseudomonas aeruginosa*

↓ 25% Drug-resistant *Candida*

↓ 21% Methicillin-resistant *Staphylococcus aureus* (MRSA)

STABLE Carbapenem-resistant Enterobacteriaceae (CRE) & drug-resistant tuberculosis (TB disease cases)

CDC strategies that work in healthcare:



Preventing device- and procedure-related infections, such as from urinary catheters or central lines



Stopping the spread of resistant germs within and between healthcare facilities



Containing emerging threats through early detection and aggressive response



Tracking and improving appropriate antibiotic use



Infection prevention and control in non-hospital settings, such as long-term care facilities

CDC strategies that work in communities:



Widespread use of vaccines to prevent infections and spread



Routine tuberculosis and gonorrhea screening for at-risk groups and prompt treatment



Using safer sex practices (e.g., condoms)



Safe food handling and preparation



Improving antibiotic use everywhere

(AR) antibiotic resistance

Figure 2: Appendix

Despite these gains, CDC's 2019 AR Threats Report shows additional actions are needed to protect people.

2.8M+ antibiotic-resistant infections each year

35k+ deaths from antibiotic resistance each year

Plus: 223,900 cases and 12,800 deaths from *Clostridioides difficile*

**AND INCREASES
IN INFECTIONS
CAUSED BY:**

↑ 315%
Erythromycin-resistant
invasive group A strep

↑ 124%
Drug-resistant
Neisseria gonorrhoeae

↑ 50%
ESBL-producing
Enterobacteriaceae

Challenges in healthcare:



Preventing the spread of germs, including in non-hospital settings such as long-term care facilities



Spread of germs from the healthcare environment (e.g., bedrails, devices, other surfaces)



Incomplete adoption of the Containment Strategy



Inconsistent implementation of some CDC recommendations (e.g., Contact Precautions)



Introduction of emerging threats from outside of the United States



Continued vigilance against serious threats like "nightmare bacteria" CRE

Challenges in the community:



Poor hygiene, such as not keeping hands clean or not wiping properly after toileting or diapering



Spread of resistant threats in the food supply



Inconsistent use of safer sex practices



Few vaccines to prevent infections and spread of resistant threats



Stopping spread of germs in animals



Understanding the role of antibiotic-resistant germs in the environment



Improving antibiotic use everywhere

For further progress, the nation must continue to innovate and scale up effective strategies to prevent infections, stop spread, and save lives.

Learn more:
www.cdc.gov/DrugResistance/Biggest-Threats

(strep) *Streptococcus*

(ESBL) extended-spectrum beta-lactamase

Revised Dec. 2019

Figure 3: Appendix

Glossary

Carbapenemase-resistant Organism (CRO): An organism, typically bacteria, that is resistant to a class of antibiotics called carbapenems. These antibiotics are the last line of defense against infection, making infections very hard to treat when resistance is present.

Carbapenemase-producing Organism (CPO): Multi-drug resistant organisms that produce enzymes to inactivate carbapenem antibiotics and typically carry resistance genes for other classes of antibiotics, making these organisms resistant to many, if not all, antibiotics and very difficult to treat. A person infected with a CPO can be colonized long-term which can spread to other individuals and/or patients in healthcare facilities.

Carbapenem-resistant Enterobacterales (CRE): A family (order) of gram-negative bacteria that are resistant to at least one of the carbapenem antibiotics. Examples of the bacteria included in the Enterobacterales order are *Escherichia coli* (E. coli), *Klebsiella pneumoniae*, *Klebsiella oxytoca*, *Enterobacter cloacae*, and *Enterobacter aerogenes*.

Carbapenem-resistant *Pseudomonas aeruginosa* (CRPA): A bacteria that can cause infection in the blood, lungs, urinary tract, and wounds, and can be resistant to several types of antibiotics, including carbapenems. *Pseudomonas* also lives in the environment and is commonly found in water, making it very easy to spread.

Carbapenem-resistant *Acinetobacter baumannii* (CRAB): A bacteria that can cause infection in the blood, urinary tract, lungs, and wounds, and can be highly resistant to antibiotics including, carbapenems.

Colonization: This occurs when a person carries a bacterium, such as a carbapenemase-producing organism, but is not showing signs and symptoms of infection. A colonized individual can unknowingly spread the bacteria that they are colonized with and cause infections in other individuals, especially patients in healthcare settings.

Carbapenemase mechanism: The gene that carries resistance to carbapenems in carbapenemase-producing organisms. There are 5 main carbapenemase mechanisms that can cause resistance: *Klebsiella Pneumoniae Carbapenemase* (KPC), *New Delhi Metallo-beta-lactamase* (NDM), *Verona Integron-Encoded Metallo-beta-lactamase* (VIM), *Imipenemase* (IMP), and *Oxacillinase-48* (OXA-48).

Rectal Screening: This screening only occurs when a person or group of people are thought to be exposed by a confirmed case to determine if the bacteria has spread and has caused infection in other individuals. People who undergo screening may have the bacteria present in the body but not be experiencing signs or symptoms of infection (colonization).

Data Notes

Surveillance: The data used to produce this report was collected by New Mexico Department of Health. All data is derived from reports of notifiable infectious diseases provided by healthcare providers, laboratories, hospitals, and clinics throughout New Mexico in accordance with New Mexico Administrative Code 7.4.3.13.

Case Counts: Each case is counted based on county of residence, not based on county of healthcare facility where the infection was diagnosed. One case is counted as one count per county, there are no duplicate counts of any one case.

Confirmed case: A case is only counted in this report if they have been confirmed positive via laboratory guidelines. Cases are confirmed based on laboratory results of antibiotic susceptibility testing for clinical and screened cases.