NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
Division of Public Health

# North Carolina Carbapenem-resistant Enterobacterales (CRE) Report




Released: December 2025 for data January 1, 2024 – December 31, 2024


This document complements surveillance data presented in the North Carolina Disease Data Dashboard found here: NC DPH: Communicable Disease Facts & Figures.

# North Carolina Carbapenem-resistant Enterobacterales Report, 2024

## Background

Carbapenems are a class of antibiotics used as a last-resort treatment for serious bacterial infections that are resistant to other antibiotics. Bacteria that are resistant to carbapenem antibiotics are very hard to treat, requiring hard to obtain antibiotics that can be more toxic than other antibiotics. Carbapenem resistance can be transmitted between bacteria in health care settings, facilitating the spread of these resistant bacteria to patients.

This review was created to provide context to the case counts of probable and confirmed Carbapenem-resistant Enterobacterales (CRE) reported to the NC Department of Health and Human Services, Division of Public Health by health care organizations. Included are known risk factors of CRE infection including health care experience, travel status, and hospitalization.

Additionally, population-level indicators including county population classification and risk factor by county scores are included.

## **Report Specifications.** Notable information about this report includes:

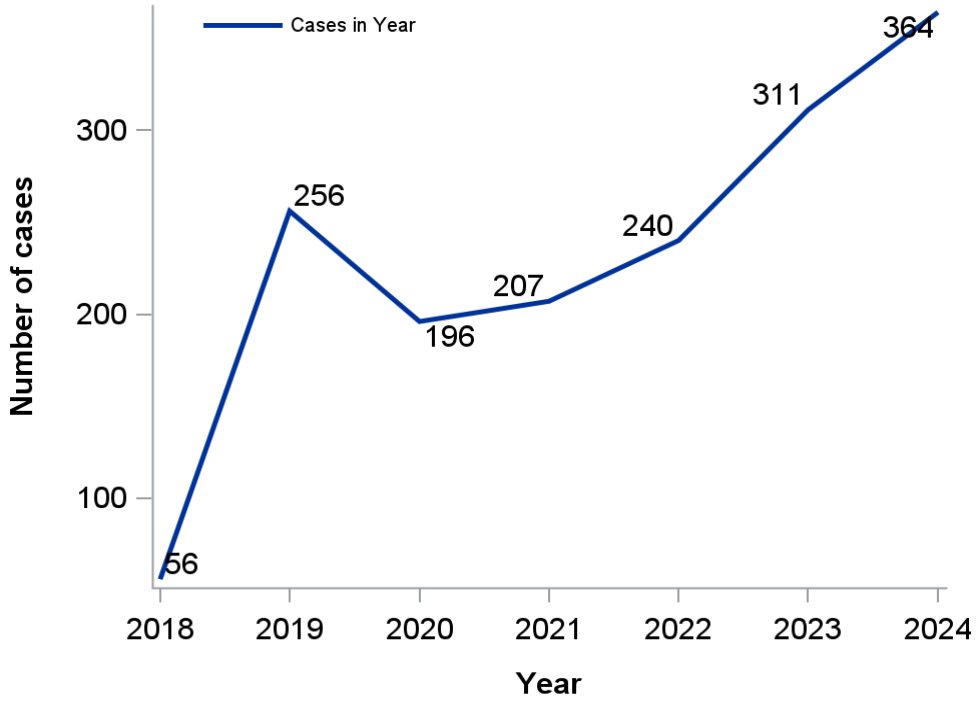
- Cases in this report include CRE classified as confirmed or probable according to the 2018 CSTE case definition and only among North Carolina residents.
- Cases are counted using the earliest date of illness identification, which is most frequently the symptom onset date. Therefore, case counts in this report may differ slightly from those published in national summaries or state dashboards, which can be based on other dates such as date of initial report to public health, or the date when case surveillance records were closed and reported to the Centers for Disease Control and Prevention (CDC).
- Ages are based on the date the case was entered in the North Carolina Electronic Disease Surveillance System (NCEDSS).
- Incidence rates are based on data obtained from the U.S. census population estimates project. Note that estimates of rates based on a small number of cases are unstable and can fluctuate widely. Lower confidence limits were limited to values greater than or equal to 0 to ensure a meaningful interval. Therefore, these estimates should be interpreted with caution. Ninety-five percent confidence intervals are shown for demographic-specific rates.
- Please note that case classification criteria are subject to change and case counts may fluctuate based on these changes.
- County population classification can help us to compare CRE incidence between population settings in rural and non-rural counties. For more information see footnote 1.[i]

## 2024 Surveillance Highlights

- CRE infections have increased every year since 2020 in North Carolina, increasing 17% from 2023 to 2024.
- CRE rates are highest in people older than 65.
- Klebsiella pneumoniae carbapenemase (KPC) production is the most common mechanism of resistance.

# North Carolina Carbapenem-resistant Enterobacterales Report, 2024

Cases of CRE in North Carolina 2018 - 2024



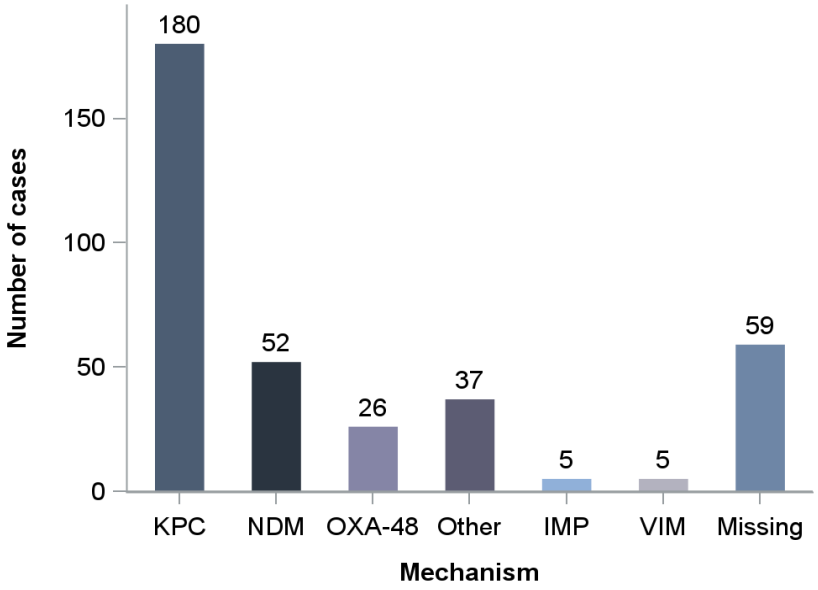

- Most CRE cases were reported in white individuals.
- While case counts were highest in white population segments, the incidence between difference races was not statistically significant.
- CRE counts and rates are highest in older age groups.

CRE demographics in North Carolina 2024

| Demographic | 2024 Count | IR/100K (95% CI) |
|---|---|---|
| **Race** | | |
| White | 190 | 3.36(1.99,4.72) |
| Black or African American | 75 | 2.51(1.15,3.88) |
| Asian/Native Hawaiian/Pacific Islander | 15 | 3.13(1.77,4.5) |
| Other/Multiple Races | 25 | 3.61(2.24,4.97) |
| Unknown | 40 | 8.63(7.26,9.99) |
| American Indian/Alaskan Native | 2 | . |
| Missing | 17 | . |
| **Ethnicity** | | |
| Hispanic | 27 | 0.16(0,1.52) |
| Non-hispanic | 251 | 2.18(0.82,3.54) |
| Unknown | 35 | 2.62(1.25,3.98) |
| Missing | 51 | . |
| **Gender** | | |
| Male | 169 | 3.05(1.69,4.42) |
| Female | 149 | 2.81(1.45,4.18) |
| Missing | 46 | . |
| **Age Group** | | |
| 0-17 | 3 | . |
| 18-24 | 6 | 0.61(0,1.97) |
| 25-49 | 41 | 1.2(0,2.57) |
| 50-64 | 91 | 4.47(3.1,5.83) |
| 65+ | 223 | 12.73(11.37,14.1) |

# North Carolina Carbapenem-resistant Enterobacterales Report, 2024

Reported CRE by mechanism of resistance, North Carolina 2024

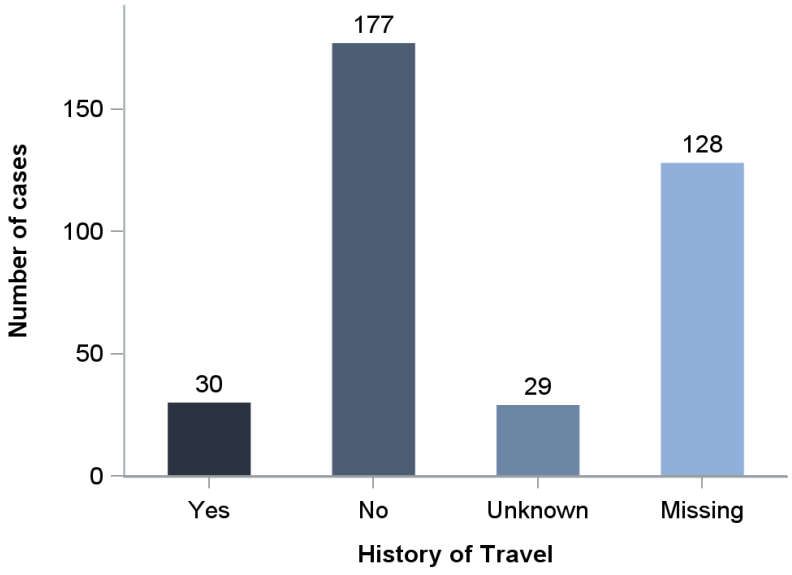



CRE use different enzymes, including KPC, NDM, OXA-48 and others to break down carbapenem antibiotics. Tracking these mechanisms helps us understand which types of resistant organisms are circulating in North Carolina.

In 2024, KPC was the most common mechanism identified in CREs (50%) followed by NDM (14%). 59 of the CRE cases were not tested for mechanism.

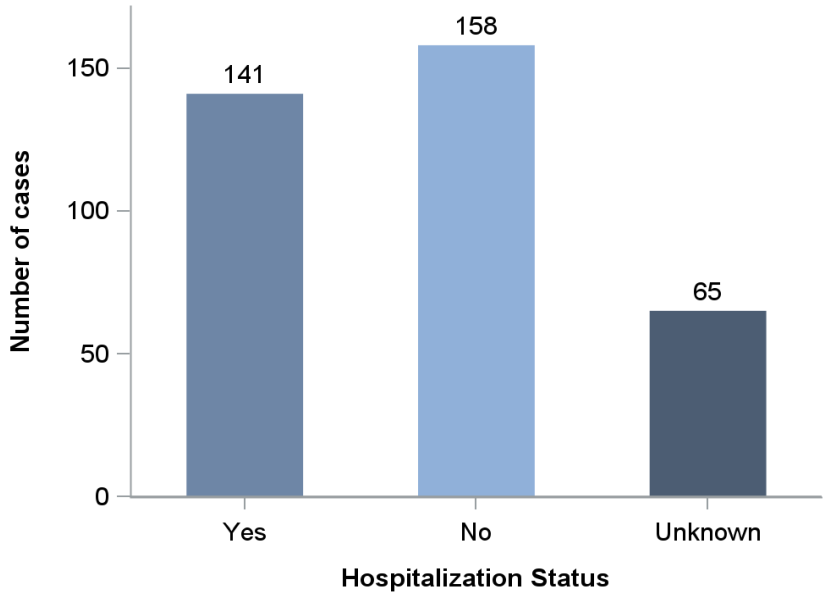
Counts of reported CRE by travel history, North Carolina 2024

Travel associated cases of CRE remain a concern globally. In 2024, most CRE cases reported in North Carolina had no associated travel documented, with travel documented in 8% of cases. Travel is defined as a history of travel outside of the patient's county of residence in the 12 months before the initial culture for CRE. Travel is self-reported by the patient. It was not consistently documented if travel was domestic or international or if the patient was in a health care setting while traveling.



# North Carolina Carbapenem-resistant Enterobacterales Report, 2024

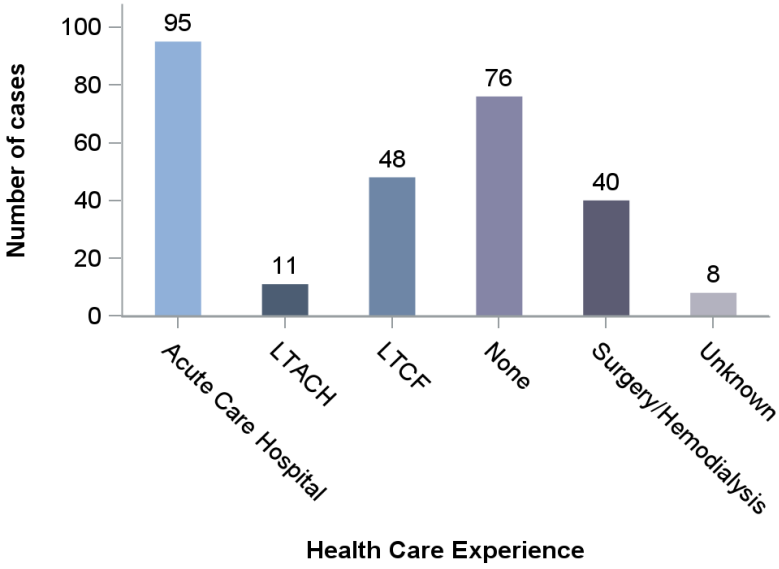
Counts of reported CRE by hospitalization status, North Carolina 2024




CRE often cause serious infections, requiring hospitalization, increased length of hospital stays, readmissions, and death. In 2024, almost 40% of CRE cases reported were hospitalized at the time of diagnosis. This includes infections identified through clinical diagnosis, screening on admission, and colonization screenings.

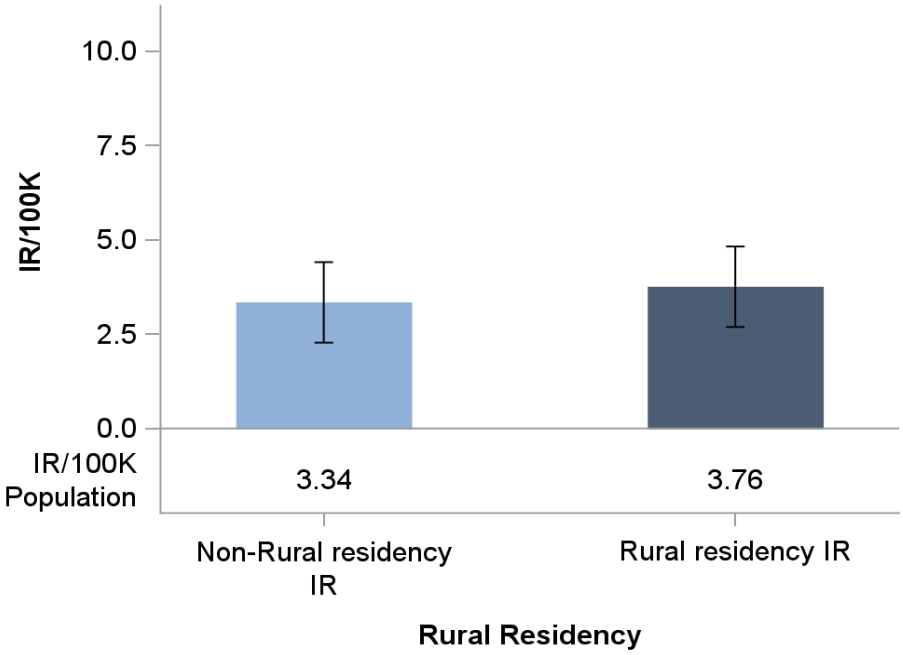
Health care experience is an important risk factor for CRE infection. In addition to possibly being the original source of infection for reported cases, CRE can potentially spread to other patients in clinical settings. Among all cases with documented health care experience, 56% reported any acute, long term acute hospital (LTACH), long-term care facility (LTCF), or surgical care in the 12 months prior to diagnosis. Nearly one-third had acute care experience. Long- term care facility experience was reported in 14% of cases. Individuals can have more than one health care experience associated with their infection.

Counts of reported CRE by documented health care experience, North Carolina 2024



# North Carolina Carbapenem-resistant Enterobacterales Report, 2024

CRE incidence among rural and non-rural residents, North Carolina 2024




CRE incidence among rural and non-rural residents, North Carolina 2024

| | Non-rural IR/100K (95% CI) | Rural IR/100K (95% CI) |
|---|---|---|
| **Population Density** | 3.34(2.27,4.41) | 3.76(2.69,4.82) |

While rural counties appear to have a higher incidence rate per 100,000 population when compared to non-rural counties, the difference is not statistically significant.

# North Carolina Carbapenem-resistant Enterobacterales Report, 2024

CRE incidence among rural and non-rural residents by race, North Carolina 2024

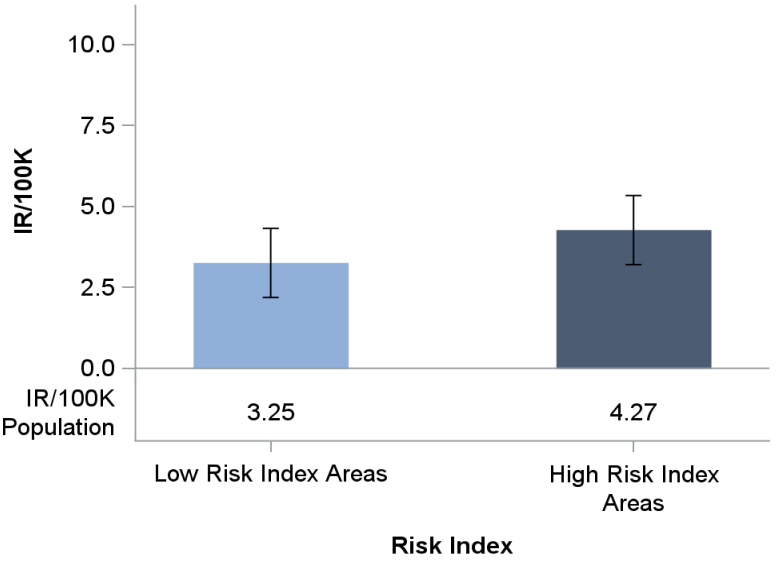
| | Non-Rural IR/100k (95% CI) | Rural IR/100k (95% CI) |
|---|---|---|
| **White** | 2.44(1.37,3.51) | 2.63(1.57,3.7) |
| **Black/African American** | 3.19(2.12,4.25) | 3.02(1.95,4.09) |
| **Other/Multiple Races** | 8.47(7.4,9.54) | 8.99(7.92,10.05) |
| **Unknown** | .** | .** |
| **American Indian/ Alaska Native** | .** | .** |
| **Asian/Native Hawaiian/ Pacific Islander** | 3.84(2.78,4.91) | .** |

**Fewer than 5 cases in population group, or one level of rurality present; no comparison made

There was no statistical difference between rural and non-rural residents within each race category.

CRE incidence among residents in areas with a high and low-risk index, North Carolina 2024

High-risk index county residents had a non-significantly higher rate of CRE infections in 2024 compared to low-risk index county residents.



[i] County Risk Factor Classification:

The U.S. Census categorizes the chance of poor health outcomes at the census tract level based on the following attributes:

I. Economic status
II. Household characteristics
III. Race and ethnicity
IV. Housing type & transportation

In North Carolina, there are 20 high-risk counties and 80 lower risk counties making up 11% and 89% of the population, respectively. In North Carolina, individuals who live in a location with a high-risk index are at increased risk of CRE infection. More detailed methods can be found here: Risk Factor Methods.

While high-risk index counties appear to have a higher incidence rate per 100,000 population when compared to low-risk index counties, the difference is not statistically significant.

In cells with low case counts, under 5 reported infections in 2024, incidence rate was not calculated due to statistically imprecise calculations and extreme values. Lower confidence limits were limited to values greater than or equal to zero to ensure a meaningful interval. Population values for incidence rates were taken from the U.S. Census categories for demographics and county population for rurality and risk index rates.