Emerging Infections Program (EIP) Network Report
Healthcare-Associated Infections Community Interface Activity
Multi-site Gram-negative Surveillance Initiative
Carbapenem-Resistant *Acinetobacter baumannii* Complex Surveillance, 2023

Case Definition:

A carbapenem-resistant *Acinetobacter baumannii-calcoaceticus* complex (CRAB) case was included in this report if there was isolation of *Acinetobacter* that is part of the *A. baumannii-calcoaceticus* complex meeting the following criteria:

- Carbapenem-resistant (doripenem [using FDA criteria], imipenem, meropenem) using the current Clinical and Laboratory Standards Institute (CLSI) clinical breakpoints (1);
- Isolated from a normally sterile specimen (e.g., blood, cerebrospinal fluid, pleural fluid, pericardial fluid, peritoneal fluid, joint/synovial fluid, bone, internal body site, muscle) or urine, or from a lower respiratory tract or wound specimen;
- Identified in residents of the surveillance area in 2023.

Surveillance Catchment Areas:

Colorado (5 county Denver area); Connecticut (Statewide); Georgia (8 county Atlanta area); Maryland (4 county Baltimore area); Minnesota (2 county Minneapolis – St. Paul area); New Mexico (1 county Albuquerque area); New York (1 county Rochester area); Oregon (3 county Portland area); and Tennessee (8 county Nashville area).

Population:

The surveillance area represents 19,589,895 persons.
Source: U.S. Census Bureau, Population Division, Vintage 2023 Special Tabulation.

Methods:

Case finding was active, laboratory-based, and population-based. Clinical laboratories that serve residents of the surveillance area were routinely contacted for case identification through a query of minimum inhibitory concentration (MIC) values from automated testing instruments. When possible, the MIC values obtained directly from the automated testing instruments were used to determine if an isolate met the phenotypic case definition. An incident CRAB case was defined as the first CRAB isolate meeting the case definition from a patient during a 30-day period.

Standardized case report forms were completed for incident cases through review of medical records. Inpatient and outpatient medical records were reviewed for information on patient demographics, clinical syndrome, outcome of illness, and relevant healthcare exposures.

Race/ethnicity was considered missing if a patient had unknown ethnicity (regardless of reported race) or if a patient had unknown race and was not Hispanic or Latino. New for 2023 data, Bayesian Improved Surname Geocoding (BISG) was used to impute missing race/ethnicity (2). BISG applies Bayes' Theorem to calculate a patient's probability of identifying with each racial/ethnic group given their surname and home census tract or county. Probabilities for patients with known race/ethnicity were set to 1 for their reported race/ethnicity group and 0 for all other racial/ethnic groups. Race/ethnicity-stratified case counts were calculated by summing the probabilities for each racial/ethnic group.

A convenience sample of CRAB isolates (N=172) was collected from EIP sites and submitted to CDC for additional testing, including species confirmatory testing, antimicrobial susceptibility testing by reference broth microdilution with a metallo-β-lactamase (MBL) screen, and real-time polymerase chain reaction (PCR) screening for carbapenemase-encoding genes, including bla_{KPC}, bla_{NDM}, $bla_{OXA\text{-}48\text{-}like}$, bla_{VIM}, bla_{IMP}, $bla_{OXA\text{-}23\text{-}like}$, $bla_{OXA\text{-}24/40\text{-}like}$, $bla_{OXA\text{-}58\text{-}like}$, and $bla_{OXA\text{-}235\text{-}like}$ genes.

Incidence rates for CRAB cases were calculated using the 2023 U.S. Census estimates of the surveillance area population as the denominator. Assessment of vital status in patients admitted to a hospital occurred at the time of discharge from the acute care hospital. For patients in a long-term care facility, long-term acute care facility, or in an outpatient dialysis center, vital status was assessed 30 days after culture collection. For all other patients, vital status was assessed using medical records from the healthcare facility encounter associated with the culture.

CRAB surveillance data underwent regular data cleaning to ensure accuracy and completeness. Patients with data entered into the data collection system as of 12/1/2025 were included in this analysis. Because data can be updated as needed, analyses of datasets generated on a different date may yield slightly different results.

Results:

Table 1. Specimen Sources for CRAB Cases by Organism, 2023 (N=396)

Organism	Total	Blood[a] No.	Blood %	Other sterile specimens No.	Other sterile specimens %	Urine No.	Urine %	Wound No.	Wound %	Lower respiratory tract No.	Lower respiratory tract %
Acinetobacter baumannii-calcoaceticus complex[b]	396	23	5.8	12	3.0	88	22.2	103	26.0	170	42.9

[a] Category may include cases with a positive blood culture and a positive culture from another specimen type (such as another sterile site, urine, wound, or lower respiratory tract)

[b] Unable to distinguish between species in *Acinetobacter baumannii-calcoaceticus* complex

Table 2: Incidence Rates of CRAB Cases by Sex, Race and Age, 2023 (N=396)

Sex	No. of Cases	%	Incidence Rate[a]
Female	130	32.8	1.3
Male	266	67.2	2.8

Age group, years	No. of Cases	%	Incidence Rate[a]
0–49	79	19.9	0.6
50–64	120	30.3	3.3
65–79	142	35.9	5.8
≥80	55	13.9	8.2

Race/Ethnicity[b]	No. of Cases	%	Incidence Rate[a]
Hispanic or Latino, any race	6	1.5	0.2
Not Hispanic or Latino – Asian or Native Hawaiian/Other Pacific Islander	8	2.0	0.6
Not Hispanic or Latino - Asian only[c]	8	2.0	0.6
Not Hispanic or Latino - Native Hawaiian/Other Pacific Islander only[c]	0	0	-
Not Hispanic or Latino – Black or African American	215	54.3	5.7
Not Hispanic or Latino – White	161	40.7	1.5
Not Hispanic or Latino – American Indian or Alaska Native or Multiracial	6	1.5	1.0
Not Hispanic or Latino – American Indian or Alaska Native only[c]	2	0.5	2.2
Not Hispanic or Latino – Multiracial only[c]	3	0.8	0.6

Total	No. of Cases	%	Incidence Rate[a]
Invasive cases[d]	37	9.3	0.2
All cases	396	100.0	2.0

[a] Cases per 100,000 population for EIP site surveillance areas (crude rates)

[b] Race/ethnicity was imputed for cases with missing race/ethnicity (2.5%, n=10 using BISG, as described in the methods section. The number of cases reported (i.e., non- missing) by race/ethnicity were 6 (Hispanic or Latino, any race), 8 (not Hispanic or Latino – Asian and/or Native Hawaiian/Other Pacific Island), 211 (Not Hispanic or Latino – Black or African American), 156 (Not Hispanic or Latino – White), and 5 (Not Hispanic or Latino – American Indian or Alaska Native or Multiracial).

[c] Case counts include reported (i.e., non-missing) data only. Missing data for these racial/ethnic groups were not separately imputed because BISG combines each of these groups with another racial/ethnic group.

[d] Invasive cases include cases with a sterile incident specimen source or an incident urine, wound, or lower respiratory tract specimen with a subsequent non-incident sterile specimen collected on the date of incident specimen collection or in the 29 days after.

Table 3. Selected Characteristics of CRAB Cases, 2023 (N=396)

Location of patient on the 3rd calendar day before incident specimen collection	No. of Cases	%
Acute-care hospital (inpatient)	152	38.4
Long-term care facility	140	35.4
Private residence	91	23.0
Long-term acute care hospital	4	1.0
Unknown or another location	9	2.3

Location of incident specimen collection	No. of Cases	%
Acute care hospital	236	59.6
Outpatient setting or emergency department	117	29.5
Long-term care facility	37	9.3
Long-term acute care hospital	5	1.3
Unknown	1	0.3

Infection types[a]	No. of Cases	%
Pneumonia	119	30.1
Bacteremia[b]	66	16.7
Urinary tract infection	62	15.7
Decubitus/pressure ulcer	61	15.4
Septic shock	41	10.4
Other	64	16.2
None[c]	70	17.7
Unknown	29	7.3

[a] Patients could have more than one type of infection reported

[b] Bacteremia includes cases with a positive blood specimen (incident or non-incident) or a documented diagnosis of sepsis, bacteremia, or blood stream infection

[c] No infection types reported

Table 4. Selected Clinical Characteristics of CRAB Cases, 2023 (N=396)

Charlson comorbidity index	No. of Cases	%
0	31	7.8
1	63	15.9
≥2	301	76.0
Unknown	1	0.3
Median (interquartile range)	3	2–4

Underlying conditions [a]	No. of Cases	%
Skin condition	272	68.7
Neurologic condition, any	226	57.1
Cardiovascular disease[b]	197	49.7
Diabetes mellitus	168	42.4
Urinary tract problems/abnormalities	141	35.6
Chronic renal disease	115	29.0
Chronic pulmonary disease[c]	90	22.7
Malignancy (hematologic or solid organ)	43	10.9
Gastrointestinal disease[d]	36	9.1
Transplant (hematopoietic stem cell or solid organ)	11	2.8
Unknown	1	0.3

SARS-CoV-2 testing	No. of Cases	%
Positive test for SARS-CoV-2 during hospitalization and on or before the date of incident specimen collection[e]	10/312	3.2

[a] Patients could have more than one underlying condition reported

[b] Defined as myocardial infarction, congestive heart failure, congenital heart disease, stroke, transient ischemic attack, or peripheral vascular disease

[c] Defined as cystic fibrosis or any chronic respiratory condition resulting in symptomatic dyspnea

[d] Defined as diverticular disease, inflammatory bowel disease, peptic ulcer disease, short gut syndrome, or liver disease

[e] Among patients in the hospital on the date of incident specimen collection. Excludes patients who were admitted to the hospital after the date of incident specimen collection. A positive SARS-CoV-2 test was defined as any positive viral test for SARS-CoV-2, including antigen and nucleic acid amplification tests. Serologic tests were excluded

Table 5. Selected Healthcare Exposures or Risk Factors of CRAB Cases, 2023[a] (N=396)

Healthcare facility stay in the year before the date of incident specimen collection	No. of Cases	%
Any healthcare facility stay	379	95.7
Acute care hospitalization	354	89.4
Long-term care facility residence	288	72.7
Long-term acute care hospitalization	25	6.3

Exposure	No. of Cases	%
Surgery in the year before the date of incident specimen collection	151	38.1
Specimen collected ≥3 days after hospital admission	133	33.6
Chronic dialysis	45	11.4

Selected medical device(s) in place in the 2 calendar days before the date of incident specimen collection	No. of Cases	%
Urinary catheter	242	61.1
Central venous catheter	113	28.5
Tracheostomy	147	37.1
Endotracheal or nasotracheal tube	34	8.6
Other[b]	211	53.3

[a] Patients could have more than one prior healthcare exposure or risk factor reported

[b] Other medical devices include gastrostomy tube, nephrostomy tube, nasogastric tube, or other device

Table 6. Outcomes of Incident CRAB Cases, 2023 (N=396)

Outcomes	No. of Cases	%
Outcome – hospitalized on the day of or in the 29 days after the date of incident specimen collection[a,b]	342	86.4
Outcome – ICU admission in the 6 days after the date of incident specimen collection[a]	70	17.7
Hospitalized patient discharged to – long-term care facility	204/342	59.6
Hospitalized patient discharged to – private residence or other/unknown discharge location	74/342	21.6
Hospitalized patient discharged to – died during hospitalization	50/342	14.6
Hospitalized patient discharged to – long-term acute care hospital	14/342	4.1
Died within 30 days of incident specimen collection date	38	9.6
Cases with an incident sterile site specimen	9/35	25.7
Cases with an incident urine specimen[c]	2/88	2.3
Cases with an incident wound specimen[d]	6/103	5.8
Cases with an incident lower respiratory tract specimen[e]	21/170	12.4

[a] Patients could have more than one outcome

[b] Data include 152 cases considered to be hospital-onset

[c] No incident CRAB cases had a subsequent non-incident blood specimen collected on the date of incident specimen collection or in the 29 days after

[d] No incident CRAB cases had a subsequent non-incident blood specimen collected on the date of incident specimen collection or in the 29 days after

[e] No incident CRAB cases had a subsequent non-incident blood specimen collected on the date of incident specimen collection or in the 29 days after

Laboratory Characterization:

Table 7.a. Molecular Characteristics of CRAB Isolates Based on Testing Performed at CDC, 2023 (N=172)

Organism	Isolates Submitted to CDC	Carbapenemase-producing, [a,b,c] - N	%
Acinetobacter baumannii-calcoaceticus complex	172	146	84.9

Table 7.b. Molecular Characteristics of CRAB Isolates Based on Testing Performed at CDC, by Carbapenemase Gene, 2023 (N=172)

Carbapenemase gene	No. of Isolates	%
$bla_{OXA\text{-}23\text{-}like}$	115	66.9
$bla_{OXA\text{-}24/40\text{-}like}$	28	16.3
$bla_{OXA\text{-}58\text{-}like}$	0	0
$bla_{OXA\text{-}235\text{-}like}$	4	2.3
bla_{NDM}	2	1.2
bla_{KPC}	0	0
$bla_{OXA\text{-}48}$	0	0
bla_{VIM}	0	0
bla_{IMP}	0	0

Table 7.c. Confirmatory Antimicrobial Susceptibility Results of CRAB Isolates Submitted to CDC, 2023 (N=172)

Organism	Carbapenem-resistant - N	Carbapenem-resistant - %
Acinetobacter baumannii-calcoaceticus complex	167	97.1

[a] Testing was performed by PCR

[b] Carbapenemase-producing isolates were collected from lower respiratory tract specimens (55/146; 37.7%), wound specimens (45/146; 30.8%), urine (n=29/146; 19.9%), blood (n=11/146; 7.5%), and other normally sterile specimens (n=6/146; 4.1%)

[c] One isolate carried two carbapenemase genes ($bla_{\text{OXA-23-like}}$/$bla_{\text{OXA-24/40-like}}$)

Summary:

Surveillance data from 2023 represent the twelfth full year of population-based surveillance for CRAB through the Emerging Infections Program. The overall crude incidence rate of CRAB in 2023 was 2.0 cases per 100,000 persons. This is a 13.0 % decrease in the crude CRAB incidence rate reported in 2022 (3). The incidence rate increased with increasing age, was higher in males than in females, and highest in persons who were Black or African American compared to persons of other races or ethnicities.

Pneumonia was the most common infection type reported. Isolates were most commonly collected while a patient was in an acute care hospital, and more than two-thirds of patients were in an acute care hospital or long-term care facility prior to their incident specimen collection. Underlying conditions were commonly reported, with most CRAB cases having a Charlson comorbidity index of ≥2. Most cases were hospitalized with 17.7% requiring ICU admission. Overall, crude mortality was 9.6%, and higher in patients who had CRAB isolated from a sterile site specimen or lower respiratory tract specimen compared to those with CRAB isolated from urine or wound.

The most common prior healthcare exposures reported were an admission to a healthcare setting in the prior year and presence of an indwelling medical device. Three percent of patients in the hospital on the date of incident specimen collection had a positive viral test for SARS-CoV-2 during their hospitalization and on or before the date of incident CRAB specimen collection.

Among the 172 CRAB isolates submitted to CDC, 84.9% were carbapenemase-producing. OXA-23-like was detected in 66.9% of the isolates, OXA-24/40-like in 16.3% of the isolates, OXA-235-like in 2.3% of the isolates, and NDM in 1.2% of the isolates.

References:

1. CLSI. *Performance Standards for Antimicrobial Susceptibility Testing.* 33nd ed. CLSI supplement M100. Wayne, PA: Clinical and Laboratory Standards Institute; 2023.

2. Elliott MN, Morrison PA, Fremont A, McCaffrey DF, Pantoja P, Lurie N. Using the Census Bureau's Surname List to Improve Estimates of Race/Ethnicity and Associated Disparities. RAND website. Available at: Using the Census Bureau's Surname List to Improve Estimates of Race/Ethnicity and Associated Disparities | RAND (https://www.rand.org/pubs/external_publications/EP20090611.html#document-details) Accessed September 19, 2025.

3. Centers for Disease Control and Prevention. 2024. Emerging Infections Program, Healthcare-Associated Infections – Community Interface Surveillance Report, Multi-site Gram-negative Surveillance Initiative (MuGSI), Carbapenem-Resistant Enterobacterales Surveillance, 2022. Available at: https://www.cdc.gov/healthcare-associated-infections/media/pdfs/2022-CRAB-Report-508.pdf

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For more information, visit our web sites:

- Multi-site Gram-negative Surveillance Initiative (MuGSI) (https://www.cdc.gov/healthcare-associated-infections/php/haic-eip/mugsi.html)

- Antimicrobial Resistance & Patient Safety Portal Emerging Infections Program | A.R. & Patient Safety Portal