

**Emerging Infections Program (EIP) Network Report**  
**Healthcare-Associated Infections Community Interface Activity**  
**Multi-site Gram-negative Surveillance Initiative**  
**Carbapenem-Resistant *Acinetobacter baumannii* Complex Surveillance, 2020**

**Note:** The COVID-19 pandemic caused significant delays in 2020 case identification, data collection, data entry, data cleaning, and isolate collection and submission in all EIP sites. Medical record review for some cases could not be completed. In 2020, 15.1% of cases did not have a complete medical record review compared to 2.9% in 2019. Therefore, the percentage of cases for which some information is unknown is higher than in previous years.

**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 body site (e.g., blood, cerebrospinal fluid, pleural fluid, pericardial fluid, peritoneal fluid, joint/synovial fluid, bone, internal body site, muscle) or urine;
- Identified in residents of the surveillance area in 2020.

**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 19,383,054 persons.

Source: National Center for Health Statistics bridged-race vintage 2020 file.

**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.

Isolates were collected as part of this activity for 2020; the laboratory characterization data are not presented in this report.

Incidence rates for CRAB cases were calculated using the 2020 US 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 8/26/2022 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, 2020 (N=119)**

<b>Organism</b>	<b>Total</b>	<b>Urine No.</b>	<b>Urine %</b>	<b>Blood<sup>a</sup> No.</b>	<b>Blood %</b>	<b>Other Sterile Sites No.</b>	<b>Other Sterile Sites %</b>
<i>Acinetobacter baumannii-calcoaceticus</i> complex <sup>b</sup>	119	78	65.6	30	25.2	11	9.2

<sup>a</sup> Category may include cases with both a positive blood and urine specimen collected

<sup>b</sup> Unable to distinguish between species in *Acinetobacter baumannii-calcoaceticus* complex

**Table 2: Incidence Rates of CRAB Cases by Sex, Race and Age, 2020 (N=119)**

Sex	No. of Cases	%	Incidence Rate <sup>a</sup>
Female	39	32.8	0.39
Male	80	67.2	0.85

Race	No. of Cases	%	Incidence Rate <sup>a</sup>
White	41	34.5	0.30
Black or African American	54	45.4	1.32
Other <sup>b</sup>	2	1.7	0.13
Unknown	22	18.5	-

Age groups, years	No. of Cases	%	Incidence Rate <sup>a</sup>
0–49	32	26.9	0.25
50–64	30	25.2	0.81
65–79	45	37.8	2.00
≥80	12	10.1	1.81
<b>Invasive cases<sup>c</sup></b>	<b>42</b>	<b>35.3</b>	<b>0.22</b>
<b>All cases</b>	<b>119</b>	<b>100.0</b>	<b>0.61</b>

<sup>a</sup> Cases per 100,000 population for EIP areas (crude rates)

<sup>b</sup> Other race includes Asian, American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, or ≥2 races reported

<sup>c</sup> Invasive cases include cases with a sterile incident specimen source or an incident urine specimen with a subsequent non-incident sterile specimen collected on the date of incident specimen collection or in the 29 days after

**Table 3. CRAB Cases by Race and Ethnicity, 2020 (N=119)**

Race/Ethnicity	No. of Cases	%
Hispanic, any race	2	1.7
Not known to be Hispanic <sup>a</sup> – White <sup>b</sup>	40	33.6
Not known to be Hispanic <sup>a</sup> – Black or African American <sup>c</sup>	54	45.4
Not known to be Hispanic <sup>a</sup> – Asian	2	1.7
Not known to be Hispanic <sup>a</sup> – Unknown race <sup>d</sup>	21	17.6

<sup>a</sup> Records either indicated ethnicity was non-Hispanic, or ethnicity was not known

<sup>b</sup> 1 CRAB case with unknown ethnicity

<sup>c</sup> 2 CRAB cases with unknown ethnicity

<sup>d</sup> Of cases with unknown race, 18 CRAB cases with unknown ethnicity

**Table 4. Selected Characteristics of CRAB Cases, 2020 (N=119)**

<b>Location of patient on the 3<sup>rd</sup> calendar day before incident specimen collection</b>	<b>No. of Cases</b>	<b>%</b>
Private residence	38	31.9
Long-term care facility/ long-term acute care hospital	37	31.1
Acute-care hospital (inpatient)	25	21.0
Homeless/unknown	19	16.0

<b>Location of incident specimen collection</b>	<b>No. of Cases</b>	<b>%</b>
Outpatient setting or emergency department	50	42.0
Acute care hospital	37	31.1
Long-term care facility/ long-term acute care hospital	16	13.4
Unknown	16	13.4

<b>Infection types<sup>a</sup></b>	<b>No. of Cases</b>	<b>%</b>
Urinary tract infection	46	38.7
Bacteremia <sup>b</sup>	41	34.5
Septic shock	11	9.2
Other	27	22.7
None <sup>c</sup>	13	10.9
Unknown	10	8.4

<sup>a</sup> Patients could have more than one type of infection reported

<sup>b</sup> Bacteremia includes cases with a positive blood specimen (incident or non-incident) or a documented diagnosis of sepsis, septicemia, bacteremia, or blood stream infection

<sup>c</sup> No infection types reported

**Table 5. Selected Clinical Characteristics of CRAB Cases, 2020<sup>a</sup> (N=119)**

<b>Charlson comorbidity index</b>	<b>No. of Cases</b>	<b>%</b>
0	16	13.4
1	14	11.8
≥2	80	67.2
Unknown	9	7.6
Median (IQR)	2	1–3

<b>Underlying conditions</b>	<b>No. of Cases</b>	<b>%</b>
Skin condition	53	44.5
Cardiovascular disease <sup>b</sup>	47	39.5
Urinary tract problems/abnormalities	44	37.0
Neurologic condition, any	43	36.1
Diabetes mellitus	41	34.5
Chronic renal disease	27	22.7
Chronic pulmonary disease <sup>c</sup>	26	21.8
Gastrointestinal disease <sup>d</sup>	11	9.2
Malignancy (hematologic or solid organ)	9	7.6
Transplant (hematopoietic stem cell or solid organ)	0	0.0
Unknown	9	7.6

<b>SARS-CoV-2 testing</b>	<b>No. of Cases</b>	<b>%</b>
Positive test for SARS-CoV-2 during hospitalization and on or before date of incident specimen collection <sup>e</sup>	9/66	13.6

<sup>a</sup> Patients could have more than one underlying condition reported

<sup>b</sup> Defined as myocardial infarction, congestive heart failure, congenital heart disease, stroke, transient ischemic attack, or peripheral vascular disease

<sup>c</sup> Defined as cystic fibrosis or any chronic respiratory condition resulting in symptomatic dyspnea

<sup>d</sup> Defined as diverticular disease, inflammatory bowel disease, peptic ulcer disease, short gut syndrome, or liver disease

<sup>e</sup> 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 6. Selected Healthcare Exposures or Risk Factors of CRAB Cases, 2020<sup>a</sup> (N=119)**

<b>Healthcare facility stay in the year before the date of incident specimen collection</b>	<b>No. of Cases</b>	<b>%</b>
Any healthcare facility stay	93	78.2
Acute care hospitalization	88	73.9
Long-term care facility residence	57	47.9
Long-term acute care hospitalization	7	5.9

<b>Exposure</b>	<b>No. of Cases</b>	<b>%</b>
Surgery in the year before the date of incident specimen collection	46	38.7
Specimen collected $\geq 3$ days after hospital admission	23	19.3
Chronic dialysis	10	8.4

<b>Selected medical device(s) in place in the 2 calendar days before the date of incident specimen collection</b>	<b>No. of Cases</b>	<b>%</b>
Urinary catheter	68	57.1
Central venous catheter	31	26.1
Other <sup>b</sup>	38	31.9

<sup>a</sup> Patients could have more than one prior healthcare risk factor reported

<sup>b</sup> Other medical devices include endotracheal or nasotracheal tube, tracheostomy, gastrostomy tube, nephrostomy tube, nasogastric tube

**Table 7. Outcomes of Incident CRAB Cases, 2020 (N=119)**

<b>Outcomes</b>	<b>No. of Cases</b>	<b>%</b>
Hospitalized on the day of or in the 29 days after the date of incident specimen collection <sup>a</sup>	77	64.7
ICU admission in the 6 days after the date of incident specimen collection	22	18.5

<b>Discharge location among hospitalized</b>	<b>No. of Cases</b>	<b>%</b>
Long-term care facility/ long-term acute care hospital	30/77	39.0
Private Residence or other discharge location	30/77	39.0
Died during hospitalization	15/77	19.5
Unknown	2/77	2.6
<b>Died within 30 days of incident specimen collection date</b>	14	11.8
Cases with an incident sterile site specimen	13/41	31.7
Cases with an incident urine specimen <sup>b</sup>	1/78	1.3

<sup>a</sup> Data include 25 cases considered to be hospital-onset

<sup>b</sup> 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

## Summary:

Surveillance data from 2020 represent the ninth full year of population-based surveillance for CRAB through the Emerging Infections Program. The overall crude incidence rate of CRAB in 2020 was 0.61 cases per 100,000 persons, with higher incidence in men than women, and higher incidence in persons of Black or African American race compared to other races. The incidence rate of CRAB was highest among persons aged 65–79 years.

Urinary tract infections were the most common infection type reported. Isolates were most commonly collected while a patient was in an outpatient setting or emergency department, and two-thirds of patients were in a private residence, long-term care facility, or a long-term acute care hospital prior to their incident specimen collection. Underlying conditions were commonly reported, with most CRAB cases having a Charlson comorbidity index of  $\geq 2$ . Most cases were hospitalized with 18.5% requiring ICU admission. Overall, crude mortality was 11.8 %, and higher in patients who had CRAB isolated from a sterile site compared to those with CRAB isolated from urine.

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 in the prior year.

## References:

1. CLSI. *Performance Standards for Antimicrobial Susceptibility Testing*. 30th ed. CLSI supplement M100. Wayne, PA: Clinical and Laboratory Standards Institute; 2020.

## Citation:

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## For more information, visit our web sites:

- Multi-site Gram-negative Surveillance Initiative (MuGSI) (<https://www.cdc.gov/hai/eip/mugsi.html>)
- Healthcare-Associated Infections - Community Interface Data Visualization (HAICViz) (<https://www.cdc.gov/hai/eip/haicviz.html>)