



Carbapenem-Resistant Enterobacteriaceae (CRE)

Characteristics of incident* cases - Colorado, 2013

Region		Colorado	Denver metropolitan ^a	Northeast ^b	Southeast ^c	Western slope ^d
Characteristic		Number (%)				
Sex	Male	62 (50%)	54 (55%)	6 (43%)	1 (13%)	1 (25%)
	Female	62 (50%)	44 (45%)	8 (57%)	7 (88%)	3 (75%)
Age (years)	<=17	1 (1%)	1 (1%)	0 (0%)	0 (0%)	0 (0%)
	18-44	18 (15%)	13 (13%)	1 (7%)	3 (38%)	1 (25%)
	45-64	42 (34%)	32 (33%)	5 (36%)	3 (38%)	2 (50%)
	≥65	63 (51%)	52 (53%)	8 (57%)	2 (25%)	1 (25%)
	Median (Range)	65 (16-93)	65 (16-93)	68 (25-88)	52 (25-71)	56 (43-68)
Organism	<i>E. coli</i>	16 (13%)	13 (13%)	3 (21%)	0 (0%)	0 (0%)
	<i>K. pneumoniae</i>	12 (10%)	9 (9%)	0 (0%)	1 (13%)	2 (50%)
	<i>K. oxytoca</i>	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	<i>E. aerogenes</i>	21 (17%)	17 (17%)	3 (21%)	0 (0%)	1 (25%)
	<i>E. cloacae</i>	73 (59%)	57 (58%)	8 (57%)	7 (88%)	1 (25%)
	<i>Other Enterobacter spp.</i>	2 (2%)	2 (2%)	0 (0%)	0 (0%)	0 (0%)
Specimen [^]	Urine	65 (52%) ^{i,j}	53 (54%)	8 (57%)	4 (50%)	0 (0%)
	Blood	17 (14%) ^{i,j}	10 (10%)	2 (14%)	3 (38%)	2 (50%)
	Intra-abdominal ^e	9 (7%) ^j	6 (6%)	2 (14%)	1 (13%)	0 (0%)
	Respiratory ^f	8 (6%) ^j	7 (7%)	0 (0%)	0 (0%)	1 (25%)
	Wound ^g	6 (5%) ^j	6 (6%)	0 (0%)	0 (0%)	0 (0%)
	Rectal	9 (7%)	8 (8%)	1 (7%)	0 (0%)	0 (0%)
	Other ^h	10 (8%) ^{i,j}	8 (8%)	1 (7%)	0 (0%)	1 (25%)
Facility Type	Acute Care Setting ^k	81 (65%)	64 (65%)	7 (50%)	7 (88%)	3 (75%)
	LTACH ^l	5 (4%)	3 (3%)	1 (7%)	0 (0%)	1 (25%)
	LTCF ^m	20 (16%)	16 (16%)	3 (21%)	1 (13%)	0 (0%)
	Outpatient ⁿ	18 (15%)	15 (15%)	3 (21%)	0 (0%)	0 (0%)
Antibiotic Susceptibility Testing	Ertapenem Nonsusceptible Only ^o	69 (56%)	56 (57%)	8 (57%)	4 (50%)	1 (25%)
PCR Testing for Carbapenemases	KPC Positive ^p	6 (29%) [N=21] ^s	6 (35%) [N=17]	0 (0%) [N=2]	0 (0%) [N=2]	0 (0%) [N=0]
	NDM Positive ^q	0 (0%) [N=18]	0 (0%) [N=14]	0 (0%) [N=2]	0 (0%) [N=2]	0 (0%) [N=0]
	OXA Positive ^r	0 (0%) [N=11]	0 (0%) [N=11]	0 (0%) [N=0]	0 (0%) [N=0]	0 (0%) [N=0]
Incidence Rate ^t (per 100,000 population)		2.4	3.8	1.3	0.8	0.7
TOTAL		124**	98 (79%)	14 (11%)	8 (6%)	4 (3%)

(Percent totals may not add up to 100% due to rounding)

*Incident cases are defined as carbapenem non-susceptible (intermediate or resistant to ertapenem, imipenem, meropenem or doripenem) and extended-spectrum cephalosporin resistant *E. coli*, *Enterobacter* species, or *Klebsiella* species >30 days after a previous incident case. In the Denver metropolitan area, clinical laboratories report CRE using the 2012 (M100-S22) or more recent Clinical and Laboratory Standards Institute (CLSI) minimum inhibitory concentration (MIC) antimicrobial susceptibility breakpoints for surveillance purposes. Outside the Denver metropolitan area, clinical laboratories may report CRE based on the CLSI antimicrobial susceptibility breakpoints currently applied in their laboratory, which can include previous years (e.g., 2011 M100-S21).

^If an incident case has two different specimens collected on the **same day**, the priority for isolates in this analysis is given to blood, then other sterile site, then urine, then other non-sterile sites. If an incident case has two different specimens collected on **different days** (within 30 days), the earliest specimen is considered the incident case, no matter the specimen type.

^aDenver metropolitan includes residents of Adams, Arapahoe, Denver, Douglas and Jefferson counties.

^bNortheast includes residents of Boulder, Broomfield, Cheyenne, Clear Creek, Elbert, Gilpin, Kit Carson, Larimer, Lincoln, Logan, Morgan, Phillips, Sedgwick, Washington, Weld and Yuma counties.

^cSoutheast includes residents of Baca, Bent, Chaffee, Crowley, Custer, El Paso, Fremont, Huerfano, Kiowa, Lake, Las Animas, Otero, Park, Prowers, Pueblo and Teller counties.

^dWestern Slope includes residents of Alamosa, Archuleta, Conejos, Costilla, Delta, Dolores, Eagle, Garfield, Grand, Gunnison, Hinsdale, Jackson, La Plata, Mesa, Mineral, Moffat, Montezuma, Montrose, Ouray, Pitkin, Rio Blanco, Rio Grande, Routt, Saguache, San Juan, San Miguel and Summit counties.

^eIntra-abdominal: body fluid from a JP drain, peritoneal fluid, colovesical fistula body fluid, liver abscess, nephrostomy, peripancreatic fluid, abdominal retroperitoneal tissue, abdominal abscess, biliary abscess drainage.

^fRespiratory: bronchoalveolar lavage (2), sputum (3), tracheal aspirate, unspecified respiratory aspirate, unspecified respiratory specimen.

^gWound: drainage from whipple procedure, ischial flap site drainage, heel.

^hOther: bone, unspecified body fluid (2), catheter tip, unspecified drainage, fluid from JP drain, sphenoid sinus, unspecified tissue, joint tissue, urethra tissue.

ⁱDuplicate Specimens: CRE from the same specimen type collected <30 days from incident culture.

^jPersistent Specimens: CRE from different specimen types collected <30 days from incident culture.

Duplicate and persistent specimens are not included as incident cases in the table, but are listed here:

Urine incident specimens: 6 duplicate urine specimens, 1 persistent rectal specimen.

Blood incident specimens: 2 duplicate urine specimens, 1 persistent rectal specimen, 1 persistent intra-abdominal specimen, 5 persistent urine specimens.

Intra-abdominal incident specimen: 1 persistent tracheal aspirate specimen.

Respiratory incident specimens: 1 persistent intra-abdominal specimen, 1 persistent rectal specimen.

Wound incident specimens: 1 persistent surgical swab (muscle) specimen, 1 persistent catheter site specimen.

Other incident specimens: 1 persistent urine specimen, 1 persistent wound specimen, 1 duplicate bone specimen, 1 duplicate rectal specimen.

^kAcute Care Setting = acute care hospital inpatient or emergency department

^lLTACH = long-term acute care hospital

^mLTCF = long-term care facility

ⁿOutpatient includes doctor's office, urgent care, dialysis center, ambulatory surgical center, etc.

^oErtapenem nonsusceptibility (intermediate or resistant) is not included in the current Centers for Disease Control and Prevention (CDC) definition for CRE, but it is included in the CDPHE surveillance definition for CRE. The current CLSI breakpoints for ertapenem are lower than breakpoints for doripenem, imipenem and meropenem.

^pKPC = *Klebsiella pneumoniae* carbapenemase (performed at the CDPHE and/or CDC laboratories)

^qNDM = New Dehli metallo-beta-lactamase (performed at the CDPHE and/or CDC laboratories)

^rOXA = "Oxacillin-hydrolyzing" beta-lactamase (performed at the CDC laboratories)

^sThe 6 KPC-positive isolates were all *K. pneumoniae* isolated from urine (4), joint tissue (1), and a rectal swab (1). Isolates were collected in acute care settings (4) and outpatient settings (clinic/doctor's offices) (2).

^tIncidence rates are calculated from 2013-based final estimates from the Demography Section, Colorado Department of Local Affairs.

**124 isolates from 119 patients