

Characteristics of Patients with Extended-Spectrum Beta-Lactamase (ESBL) Producing Enterobacterales Tennessee, 2019-2020



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Background

- Extended-Spectrum Beta-Lactamases (ESBL) are a group of enzymes that hydrolyze some commonly used antibiotics, including penicillins and cephalosporins.
- Like other multi-drug resistant organisms, ESBL-producing Enterobacterales have historically been described in patients with prior healthcare exposure, such as those in hospitals and long-term care facilities (LTCF).
- Studies are citing an increase in the number of community associated ESBL Enterobacterales infections.

Methods

- ESBL cases were defined as isolation of *Escherichia coli*, *Klebsiella pneumoniae*, or *Klebsiella oxytoca* from a normally sterile body site or urine. A case was the first specimen per organism collected per calendar year for each patient identified.
- Isolates had to show resistance to cefotaxime, ceftriaxone, or ceftazidime and be non-resistant to all tested carbapenems.
- Catchment area included specimens collected in Maury, Lewis, Marshall, and Wayne counties in Tennessee.
- Specimens were collected between July 1st, 2019, and December 31st, 2020.
- Data was collected by reviewing patient medical records and analysis was performed using SAS 9.4

Figures/Results

Figure 1: Patient Location Three Days Prior to Specimen Collection

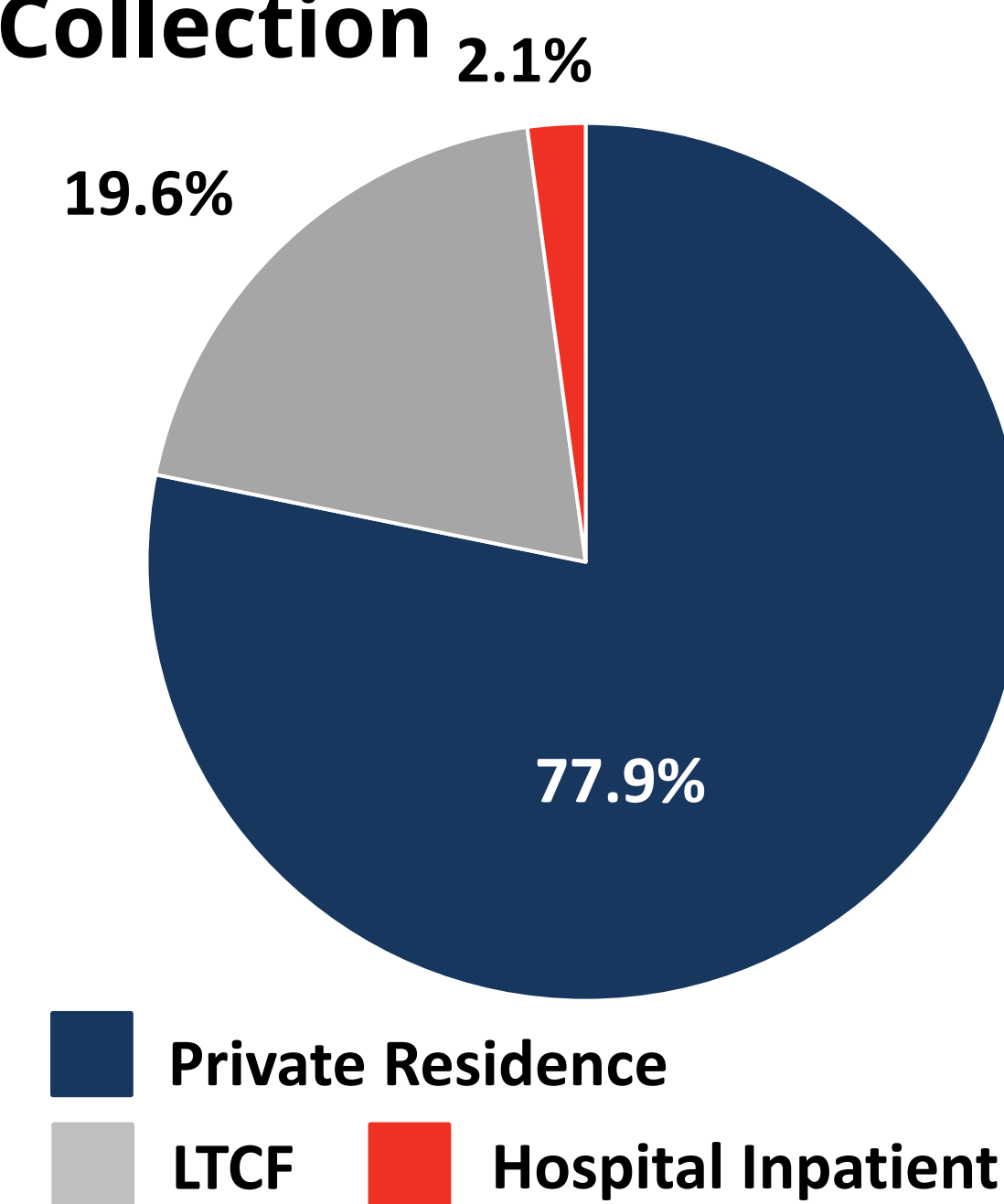


Figure 2: Location of Specimen Collection

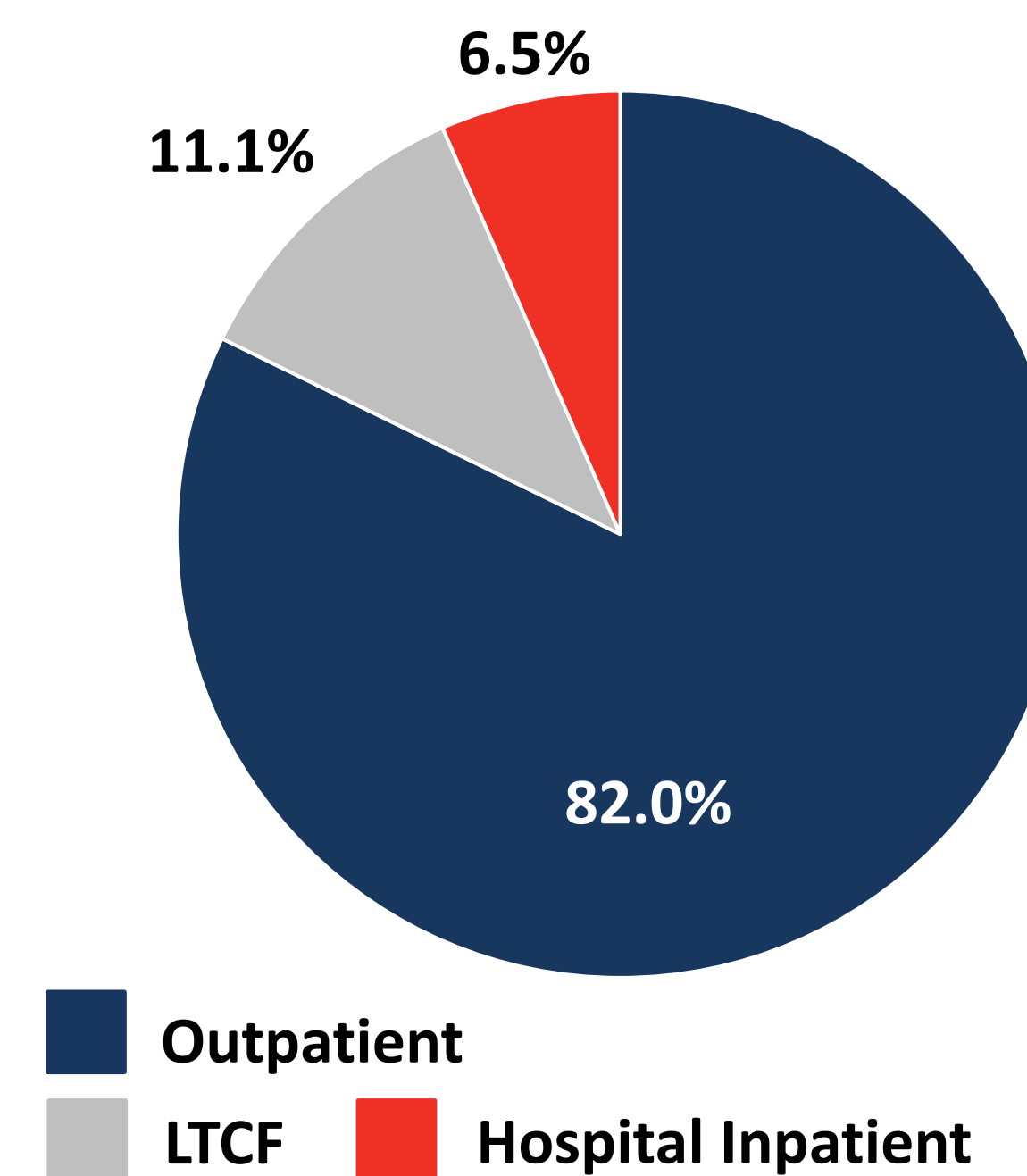


Figure 3: Community or Healthcare Associated

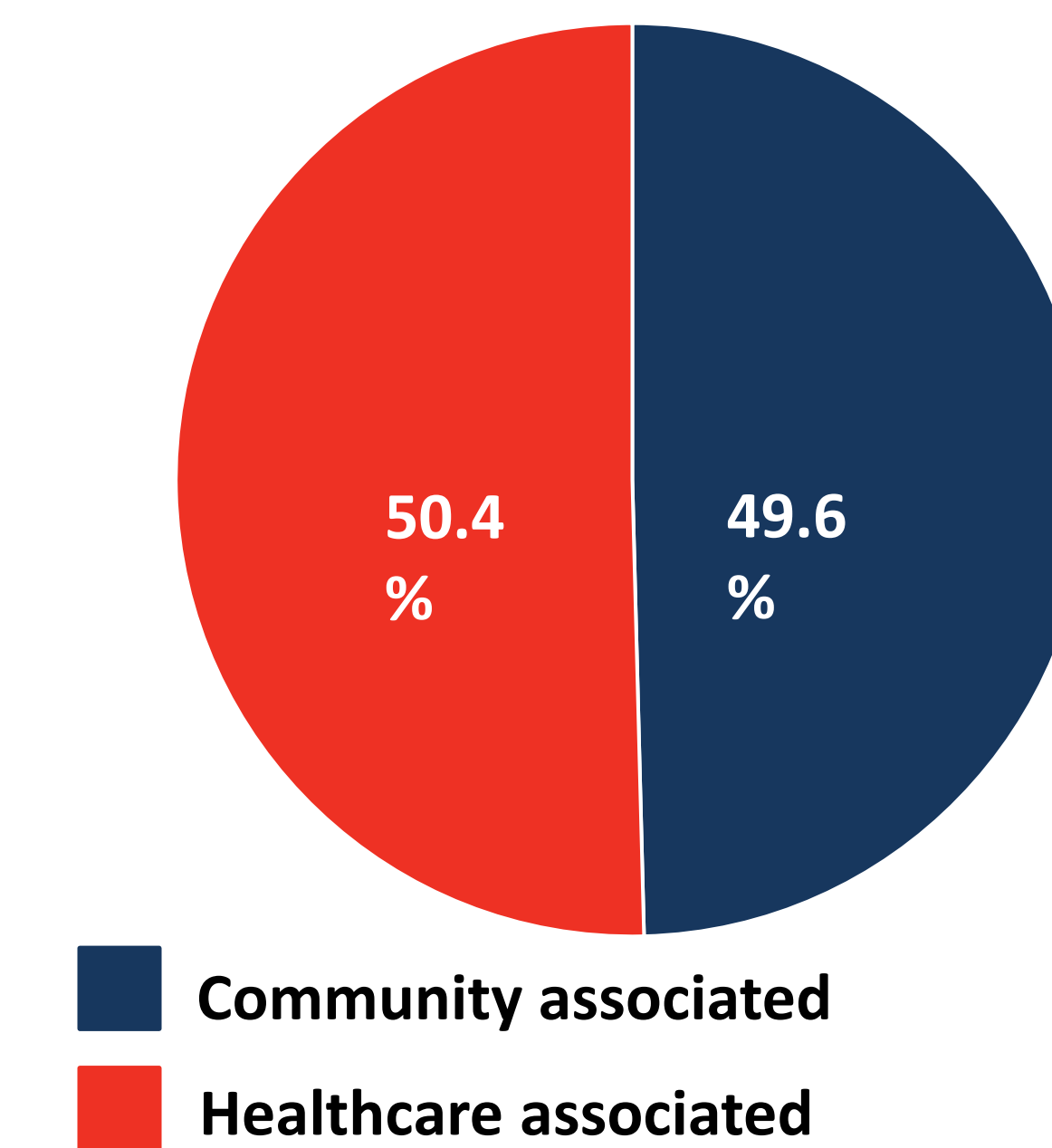
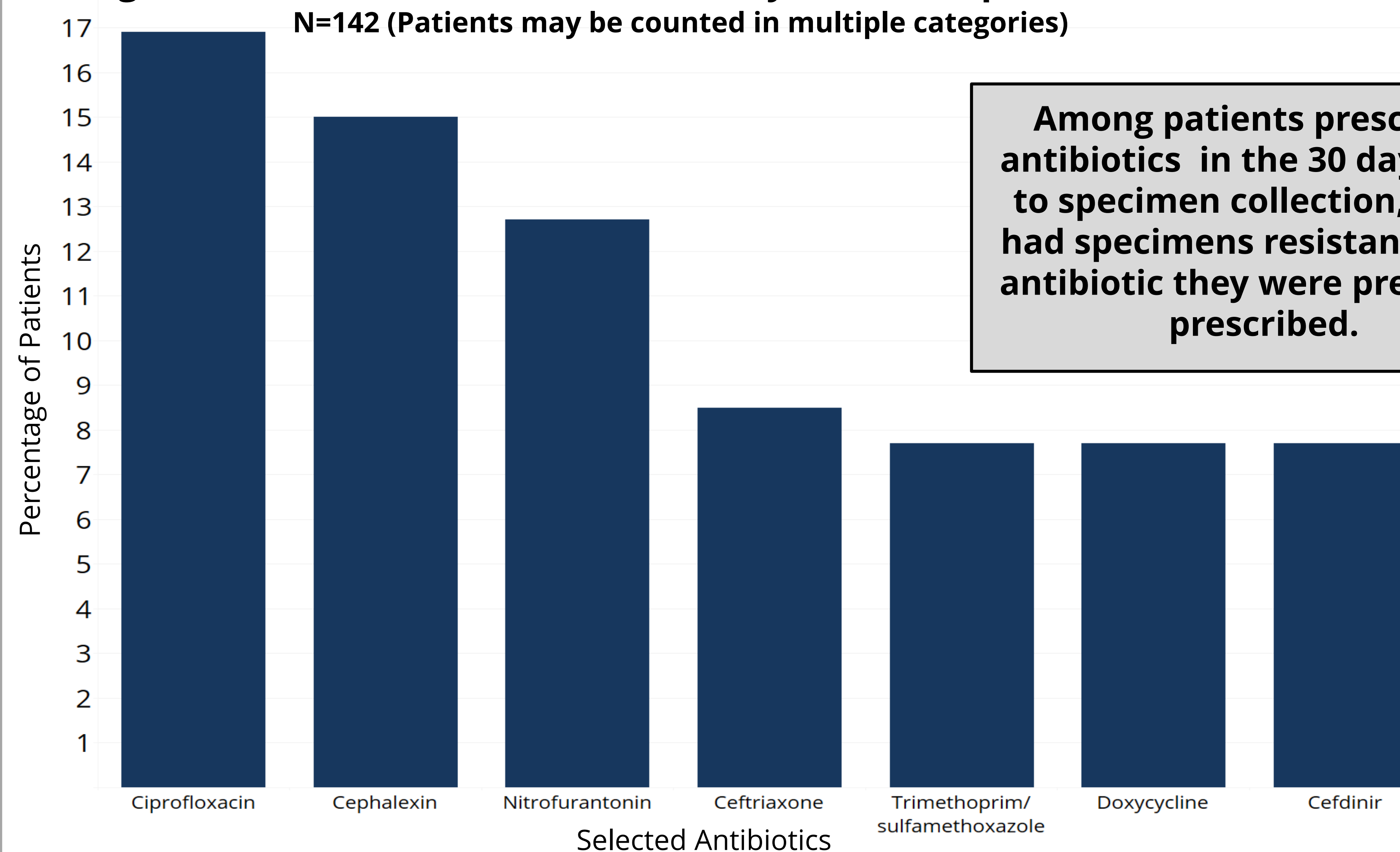


Figure 4: Patient Characteristics

	No. of Cases (%) N=566
Race	
White	459 (81.1%)
Unknown	55 (9.7%)
Black	50 (8.8%)
Asian	2 (0.4%)
Sex	
Female	459 (81.1%)
Average Age (years)	66.2 (Range: 1-98)
Organism Isolated	
<i>Escherichia coli</i>	517 (91.3%)
<i>Klebsiella pneumoniae</i>	43 (7.6%)
<i>Klebsiella oxytoca</i>	6 (1.1%)
Specimen Collection Site	
Urine	560 (98.9%)
Blood	6 (1.1%)
Underlying Conditions	
Diabetes	193 (34.1%)
Recurrent UTI	174 (37.2%)
Obesity	112 (19.8%)
Chronic Kidney Disease	85 (15.0%)
Dementia	80 (14.1%)

Figure 5: Antibiotics Used in the 30 Days Prior to Specimen Collection



Among patients prescribed antibiotics in the 30 days prior to specimen collection, 17.4% had specimens resistant to the antibiotic they were previously prescribed.

Conclusions

- Nearly half of all ESBL-producing Enterobacterales cases were defined as community associated and the majority had specimens collected at outpatient clinics.
- Most cases identified were among white women with UTIs, often recurrent, coming from private residences.
- There is an opportunity to improve appropriate use of antibiotics based on susceptibility data as over 17% of patients had been previously prescribed antibiotics to which the specimen was resistant.
- Further analysis is necessary to identify risk factors related to community associated ESBL Enterobacterales infections, as targeted intervention is imperative to reduce the spread of ESBL infections.

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