

Extended-Spectrum Beta-Lactamase Enterobacterales Surveillance

Monroe County, NY, 2020-2022

WHAT WE DO

The Rochester Emerging Infections Program (EIP) performs population- and lab-based surveillance for organisms and infections of public health importance in collaboration with the CDC and 11 other state sites across the US.

WHAT IS ESBL?

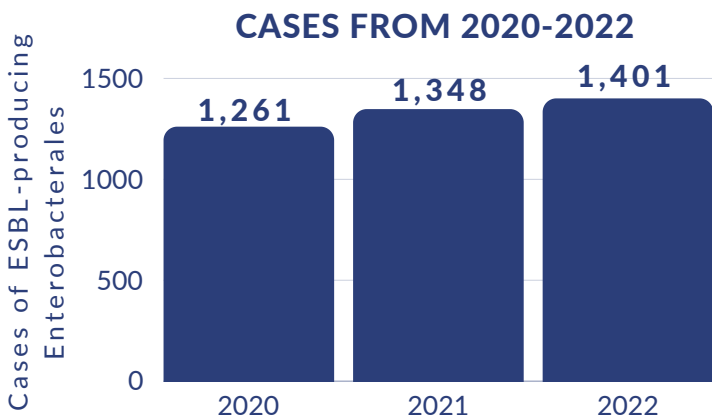
Extended-spectrum beta-lactamase (ESBL)-producing Enterobacterales are bacteria that pose a threat in health care and community settings due to their resistance to many common antibiotics.

ESBLs are enzymes that can break down common antibiotics, including cephalosporins, leaving them ineffective. They have the ability to spread rapidly, cause infections in healthy people, and often require IV antibiotic treatment in the hospital rather than oral options.

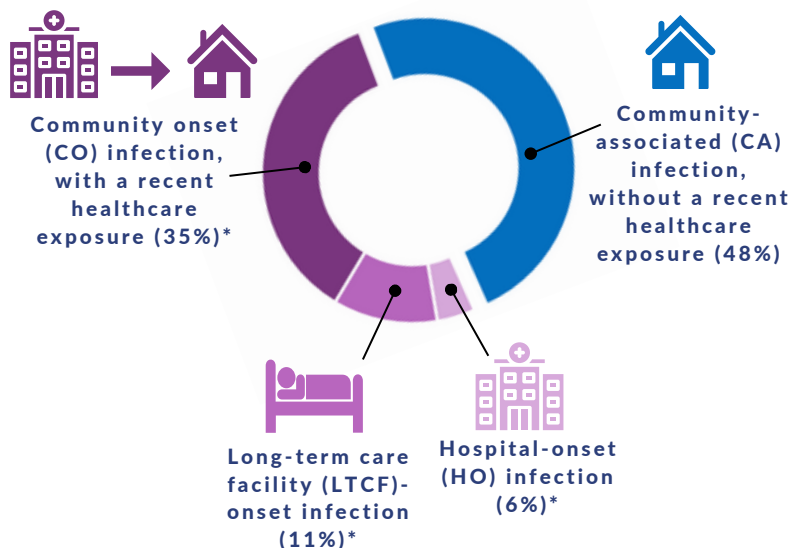
ESBL SURVEILLANCE

An ESBL case is defined as a culture positive for *Escherichia coli*, *Klebsiella pneumoniae*, or *Klebsiella oxytoca* that is 1) resistant to ≥ 1 3rd-generation cephalosporin and 2) non-resistant to carbapenems.

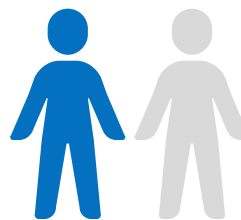
Between 2020 and 2022, our surveillance identified 4,010 ESBL cases in Monroe County. We obtained detailed information for 3,022 (75%) of these cases among 2,498 unique patients. 16% of patients had more than one ESBL infection.



WHERE INFECTIONS CAN HAPPEN

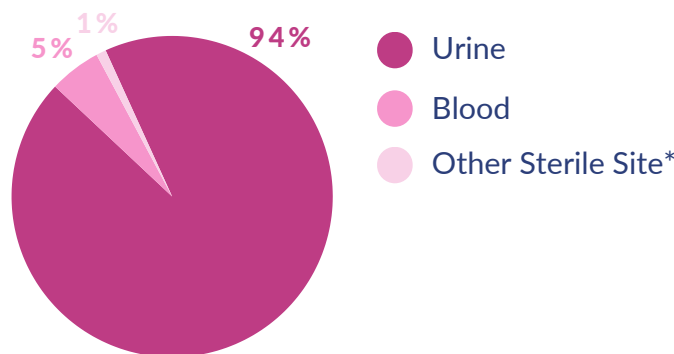


*CO, LTCF, and HO are classified as Healthcare-Associated Infections (HCA)



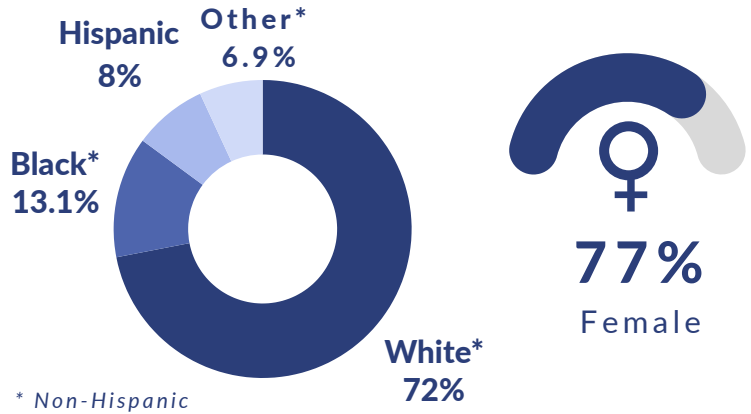
1 IN 2 ESBL CASES WERE COMMUNITY-ASSOCIATED

9 IN 10 CULTURES WERE FROM URINE



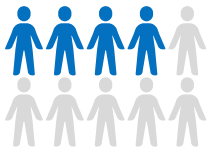
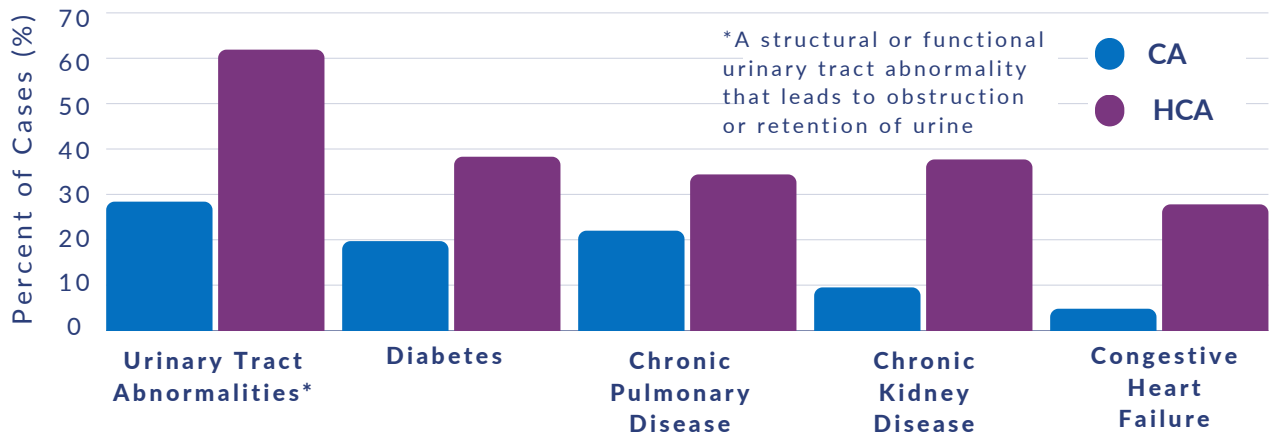
*Cerebrospinal fluid, pleural fluid, pericardial fluid, peritoneal fluid, joint/synovial fluid, bone, internal body site, muscle, deep tissue or other normally sterile site

THE MAJORITY OF CASES WERE FEMALE, NON-HISPANIC, WHITE, WITH A MEDIAN AGE OF 66 YEARS



HEALTH CONDITIONS & RISK FACTORS

Percent of Cases with a Pre-Existing Health Condition

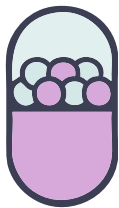


4 IN 10 COMMUNITY-ASSOCIATED CASES HAD RECURRENT UTI

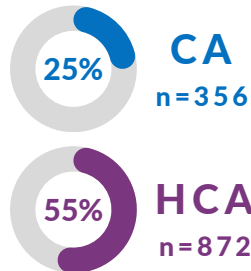
1 IN 3 COMMUNITY-ASSOCIATED CASES HAD NO PRIOR HEALTH CONDITIONS

ANTIBIOTIC USE WAS COMMON PRIOR TO A POSITIVE CULTURE

n=3,011

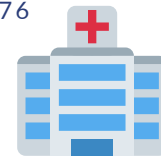


41% received 1+ antibiotic in the 30 days prior to a culture

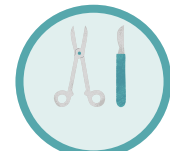


MANY HCA CASES HAD A PRIOR HEALTHCARE EXPOSURE, INCLUDING:

n = 1,576



76% hospitalized



36% had surgery



35% stayed at a nursing home



35% had a urinary catheter

Most common antibiotic classes

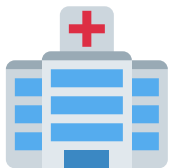
CA

1st/2nd Gen Cephalosporins
TMX-SMX
Nitrofurantoin

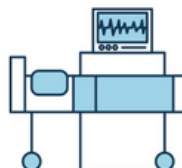
HCA

1st/2nd Gen Cephalosporins
β-lactam Combinations
Vancomycin

OUTCOMES OF AN ESBL INFECTION



25%
of cases diagnosed in the community were hospitalized



28%
of cases diagnosed in the hospital were admitted to the ICU

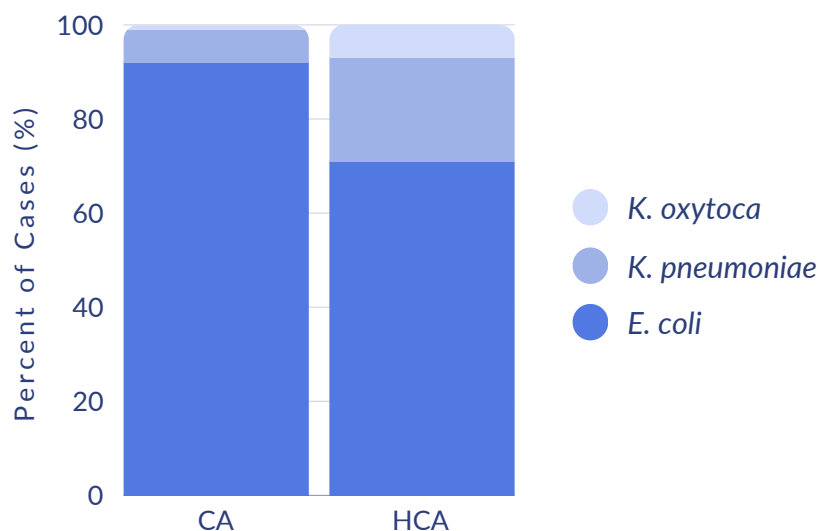


3% of cases with a positive urine culture died within 30 days*
17% of cases with a positive blood or sterile site culture died within 30 days*

*all-cause mortality

8 IN 10 CASES WERE CAUSED BY E. COLI

K. PNEUMONIAE & K. OXYTOCA WERE MORE COMMON AMONG HEALTHCARE-ASSOCIATED CASES



TOGETHER, CTX-M ENZYMES & ST131 STRAINS CAN RAPIDLY SPREAD RESISTANCE

- 87.5% of isolates tested at CDC labs had the CTX-M ESBL enzyme, which can be shared through DNA between different Enterobacteriales species
- The most common strain of ESBL-producing *E. coli* is ST131, accounting for 54.3% of cases. This strain is known for causing more severe infections and spreading easily and is often resistant to quinolones in addition to cephalosporins

CONCLUSION

- Most ESBL cases were caused by *E. coli* cultured from urine, commonly in females ages 65 years and older, many of whom had a history of recurrent UTI
- Half of the ESBL cases had no healthcare exposure in the year prior or medical devices 2 days prior to culture collection
- 41% of cases were prescribed antibiotics within the 30 days prior to their positive culture
- Understanding ESBL risk factors is crucial for identifying at-risk populations and informing targeted preventive strategies, such as vaccination

Center for Community Health & Prevention

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For more information on ESB: www.cdc.gov/hai/eip/mugsi.html

