



ESBL & AmpC?

Are you seeing reports like this with increasing frequency?

Culture

Escherichia coli (ESBL Producer) >10⁵ organisms/ ml

COMMENT:

This is an Extended Spectrum Beta-Lactamase (ESBL) producer and a cross infection risk.

What is ESBL & AmpC?

- Extended-spectrum β -lactamase
- AmpC β -lactamase

ESBL and AmpC are **enzymes** produced by some **Gram-negative bacteria**, which render most **β -lactam antibiotics** (penicillins and cephalosporins) **inactive**.

The **genetic coding** for ESBL and AmpC is **readily transferrable** between bacteria, resulting in widespread dissemination both within hospital and the community, making bacteria carrying these enzymes an **infection control** problem—particularly in hospital. At present, there is **no benefit** from attempting to **decolonise** the patient. **Good hand hygiene** when in contact with patients, especially those who are incontinent or catheterised, will help **reduce spread**. The **indication** for **catheters** should be **regularly reviewed**, and wherever possible they should be **removed**.

When a coliform that has already developed resistance to trimethoprim acquires the ESBL or AmpC gene, oral options for treating a UTI become limited—as co-amoxiclav, Tazocin, cephadrine, ceftriaxone, etc. become ineffective. Some alternative **oral** agents that can be useful include **nitrofurantoin**, **pivmecillinam** and **fosfomycin**—sensitivity to these may be available on your microbiology report.

Patients with symptoms require treatment to avoid development of bacteraemia; those who are asymptomatic can be labeled “**asymptomatic bacteriuria**” and do **not** have an infection. This should **not** be thought of as “**recurrent UTI**” - see FAQs on recurrent UTI at www.exeterlaboratory.com. There is **no need to repeat urine culture** if asymptomatic or to check the infection has resolved.

If in doubt, email the **duty Medical Microbiologist** at:

rde-tr.MicroConsultants@nhs.net

β -lactamases

- A collection of **enzymes** produced by **Gram-positive** and **Gram-negative** bacteria.
- Cause **hydrolysis** of the beta-lactam ring—**inactivating** the antibiotic.
- Different types of β -lactamase affect different antibiotics.

Nitrofurantoin

- Now **first-line treatment** for UTI, including patients with an **eGFR of 30 mL/min** for ≤ 7 days.
- Entered clinical use in 1953, yet **resistance rates** remain **low** thanks to an unusual mechanism of action.
- **Best tolerated** as the **modified-release preparation** taken twice daily.

Pivmecillinam

- **Penicillin-based** oral antibiotic, discovered in the 1970s.
- Despite being a β -lactam antibiotic it **retains activity** against many **ESBL & AmpC** producing bacteria.
- Licensed for the treatment of **acute uncomplicated cystitis**.

Fosfomycin

- Discovered in the 1960s—a **novel antibiotic**, within its own class.
- **Retains activity** against many **multidrug resistant UTI-causing pathogens**.
- Prescribed as an oral **single-dose** 3g sachet in women.