

Extended-spectrum beta-lactamase (ESBL) producing bacteria

What are ESBLs?

Extended-spectrum beta-lactamases (ESBLs) are enzymes produced by some species of Enterobacteriaceae (also known as coliforms) such as *E. coli* and *Klebsiella* species that are part of the normal intestinal flora of humans and many animals. There are many types of ESBL enzymes, but all of them cause resistance to several commonly used antibiotics such as penicillins and cephalosporins. The resistance genes are carried on mobile genetic elements known as plasmids which are easily transferred between species.

Similar to sensitive strains, ESBL-producing bacteria are capable of causing local infection such as urinary tract or wound infection, or systemic infection such as sepsis. Resistance to multiple antibiotics makes these infections difficult to treat, and results in poor outcomes for patients. ESBL-producing bacteria are a particular problem for patients in critical care units, where the much higher overall usage of antibiotics may lead to their selection.

The worldwide incidence of infection with ESBL-producing bacteria has been increasing in recent years, particularly in community settings, although at present it remains relatively low in Australia compared to some countries in Asia and parts of Europe.¹

Mode of Transmission

ESBL-producers are spread in a similar manner to other multi-resistant organisms, via inadequately decontaminated hands of staff and indirectly via the environment (contaminated surfaces and equipment). ESBL-producers are capable of prolonged survival on wet surfaces, and have been found colonising taps and sink drains in wards, which have been identified as common sources for prolonged outbreaks of infection in critical care wards.²

Because these organisms are carried in the bowel, colonised or infected patients who have diarrhoea, faecal incontinence, a colostomy or ileostomy, or whose hygiene practices may be compromised by cognitive or functional impairment, are more likely to contaminate their surrounding environment. In critical care patients, ESBL-producers may be found colonising invasive device insertion sites, particularly tracheostomies.

Why is it important to control the spread of ESBLs?

Approximately 30% of all healthcare-associated infections are caused by Enterobacteriaceae, and this percentage may be even higher among critically ill patients. Serious infections due to ESBL-producers have been shown to be associated with a high morbidity and mortality. Patients who have a compromised immune system or are in critical care units are especially vulnerable to infection.

What is SA Health doing about ESBLs?

Control of ESBL-producers involves the application of a number of strategies, including the promotion of optimum antibiotic usage (antimicrobial stewardship) and infection prevention procedures.³ SA Health promotes the use of best practice infection control guidelines and also monitors the incidence of healthcare associated infection with multi-resistant organisms, including ESBL-producers. SA Health has developed resources on Antimicrobial Stewardship to prevent the over-use of antibiotics that are known to promote the development of ESBLs.⁴

Hospitals and other health care settings should have clear written guidelines for the management of patients with ESBL. It is important that all clinical staff are aware of and understand these guidelines.

Are healthcare workers at risk?

ESBL-producing bacteria pose minimal risk to healthy staff, and this risk is further minimised by adherence to correct hand hygiene and use of standard and transmission-based precautions as appropriate.

How can healthcare workers assist?

Staff should be aware of, and implement, the required precautions when dealing with known infected or colonised patients, such as the wearing of appropriate personal protective equipment when dealing with body fluids, including urine, faeces and tracheal suction fluids, and by performing hand hygiene according to the SA Health Hand Hygiene Policy Directive.⁵

Is routine screening for ESBL carriage required?

There is currently no consensus on the need for routine screening for ESBL carriage. Laboratory methods for detection of carriage are relatively insensitive, and a negative result does not confirm that a patient does not harbour the resistance in low numbers.

Confidentiality

As for any other medical information, it is the responsibility of all staff within the hospital to maintain the confidentiality of patients with regard to their condition. A patient's multi-resistant organism status should not be allowed to compromise their care, nor should a person be refused admission to any facility based on their ESBL status.

References

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3. NH&MRC. *Australian Guidelines for the Prevention and Control of Infection in Healthcare*, 2010. Australian Government Department of Health.
4. SA Health Antimicrobial Stewardship resources. Available at: www.sahealth.sa.gov.au/antimicrobials
5. SA Health Hand Hygiene Policy Directive and Hand Hygiene Clinical Guideline. Available at: <http://www.sahealth.sa.gov.au/HandHygiene>

For more information

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Public -I1-A2

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Version 1.4 (Feb2018)



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