POLICY & PROCEDURE NUMBER: 4.29
DEPARTMENT: **Infection Control** **SUBJECT:** ***Extended Spectrum Beta Lactamase (ESBL) Producing Bacteria***

APPROVAL DATE: April 2004 **REVISION DATE:** March 2016
REVISION DATE: March 2017 **REVIEW DATE:** November 2018

BACKGROUND:

ESBL's are Gram-negative bacteria that produce an enzyme, beta-lactamase that has the ability to break down commonly used antibiotics, such as penicillins and cephalosporins (including third generation) and render them ineffective for treatment. If ESBL-producing bacteria cause an infection, a different antibiotic may need to be used to treat the infection. People who carry ESBL-producing bacteria without any signs or symptoms of infection are said to be colonized. The commonest ESBL-producing bacteria are some strains of Escherichia coli and Klebsiella pneumonia.

ESBL is a common cause of urinary tract infections. Treatment options are limited for these infections. The lower digestive tract of colonized residents is the main reservoir for ESBL-producing bacteria. Gastrointestinal carriage can persist for months. ESBL can survive in the health care environment however the environment is rarely implicated in outbreaks. It is not known how long bowel colonization persists however endemic strains may persist in health care setting for years.

PURPOSE

To identify and prevent spread of this infection from one resident to other residents and/or staff.

ESBL Acquisition and Transmission:

Risk factors for ESBL infection and colonization include:

- Prolonged and extensive treatment with third-generation cephalosporins or fluoroquinolones
- Prolonged hospital stay (particularly in ICU)
- Severity of illness (neutropenia, transplant recipients and those on TPN)
- Presence if indwelling catheters (especially urinary, arterial or central venous)
- Transplant recipients
- Renal replacement therapy

ESBL Transmission:

- ESBL is spread via direct and indirect contact with colonized/infected residents and contaminated environmental surfaces.
- ESBLs are not airborne. ESBLs are most commonly spread via unwashed hands of health care providers.

Screening for ESBL-Producing Bacteria

Local epidemiology should govern decision-making regarding routine screening of residents for ESBL-producing bacteria. If the local incidence of ESBL-producing bacteria is high, there is some value to routinely screening.

An effective and consistent approach to surveillance is an important measure to prevention and control the spread of ESBLs. In an ESBL outbreak, protocols should be in place for screening residents in close proximity to colonized/infected residents (e.g. roommates) who may have been exposed or who have risk factors for ESBL acquisition.

Residents with known ESBL carriage should have their records flagged and should be placed on Contact Precautions.

There is insufficient evidence to recommend routine screening (including epidemiologic risk screening and active surveillance culture screening) of resident for colonization with ESBL.

For residents with symptoms of infection, specimens should be sent for culture. There should be a high index of suspicion for the presence of ESBL in residents at risk for infection with these bacteria, particularly residents transferred from facilities know to have high ESBL prevalence rates; roommates of ESBL colonized/infected patients; and residents known to have been previously infected or colonized with and ESBL.

If a resident is found to be colonized or infected with ESBL more than 48 hours after admission, consider clinical screening (i.e. assessing the presence of infection) with laboratory testing of clinically relevant specimens (e.g. urine in the setting of urinary tract infection or presence of an indwelling bladder catheter; wound in the setting of skin and soft tissue infection or open wound) _ of any roommates the resident had during hospitalization.

There is no indication for surveillance culture testing of healthcare providers, family or visitors, or, in the absence of a major outbreak, for environmental sampling.

Collection and Timing of Specimens for ESBL-Producing Bacteria

A substantial percentage of residents who develop health care associated ESBL infections have preceding colonization of the gastrointestinal tract.

The preferred specimen for ESBL screening is a rectal swab or stool. A urine culture may also be sent in certain situations (e.g. catheterized patient/resident). In one study, the inguinal area was found to be colonized with ESBL-producing bacteria when the perianal area and urine were negative.

Follow-Up Screening

-If positive, screen for 6 months
-Consultation with ICP and Physician
-Once 3 negative specimens are obtained, additional precautions can be discontinued
-then screen monthly for 6 months to monitor antibiotic-resistant organism status

Positive ESBL specimen

1. Initiate Contact Precautions, post signage on door and use personal protective equipment according to contact precautions – refer to policy IC 2.2 a) and 2.2 b).
2. Complete swabs of residents who share bathroom facilities with a resident with a positive specimen.
3. Discuss whether it is possible to move the resident to a private room. Complete risk assessment if not, based on roommate suitability. If a single room is not available residents colonized or infected with ESBL may be cohorted with other residents after consultation with the Manager of Resident Care.

- The following order of preference for cohorting must be used:
    1. Residents with ESBL should be cohorted with other residents with ESBL.
    2. If cohorting is not possible, the affected resident may be placed with low-risk roommates. Staff should tend to the non-infected resident first if cohorting is not possible.
    3. ESBL residents should not share a room with residents who have open wounds or decubitus ulcers, residents with urinary catheters, feeding tubes or other invasive devices, residents whose hygiene is compromised or residents who have debilitative or bed-bound conditions that required extensive hands-on care.
    4. If residents with ESBL are cohorted with residents who do not have ESBL there should be increased attention to environmental cleaning throughout the duration of the cohort.
    5. Dedicated equipment and supplies are required for the ESBL positive resident.

4. Hand Hygiene should always be performed as according to the hand hygiene policy IC 2.3. Alcohol based hand rubs are effective against ESBL bacteria.
5. All resident care equipment (e.g. thermometers, blood pressure cuff etc.) should be dedicated to the use of resident and cleaned and disinfected as per Routine Practices before reuse with another resident.
6. There is no need to restrict the resident's participation in facility activities. Contain any feces, urine or purulent discharge; cover open wounds/tracheostomy sites well.
7. Assist resident with performing hand hygiene before leaving room. If the resident cannot follow basic hygienic measures, be sure resident is supervised during personal care.

Environmental

1. Housekeeping staff will wear gloves and gown and follow precautions as listed above.
2. Clean room daily with accelerated peroxide solution.
3. Clean all surfaces from clean to dry and high to low areas of the room; give extra attention to door handles, light switches, call cords, bedrails and hand rails by toilet.
4. Notify housekeeping with discontinuation of precautions once three negative specimens are obtained. Additional precautions can be discontinued as per protocol to complete terminal clean.
5. No specimen precautions are recommended for laundry or waste management. Routine Practices are sufficient.

ESBL Decolonization
ESBL decolonization is not effective and not recommended.

Visitors:

- There is no need to restrict visitors.
- Visitors do not need to wear gowns or gloves unless they are providing direct care to a resident who is colonized or infected with ESBL.
- Educate visitors regarding good hand washing technique.

Notification/Transfers
Notify all receiving facilities of resident's ESBL status ahead of transfer.

If a resident is identified with ESBL and has been transferred to another health care setting, that health care setting should be notified so that the necessary precautions can be arranged. A negative status is not required prior to transferring a resident with ESBL. Staff shall wear appropriate PPE (gloves and long-sleeved gloves) if they will have physical contact (i.e., lifting during transport of a resident who is colonized or infected with ESBL. All transport equipment must be disinfected immediately after use using a hospital grade disinfectant.

Staff considerations

The risk of staff acquisition of ESBL is low and significantly reduced if staffs follow routine practices, perform hand hygiene and wear PPE appropriately.

Outbreak Management

An outbreak occurs when there is an increase in the rate of new cases (infected and colonized) over the baseline for the home or a clustering of new cases. Clustering is the occurrence of two or more cases closely related by time, location, or other epidemiologic linkages.

- Place each resident on additional precautions once tested positive for ESBL.
- Contact public health for discussion and review of positive ESBL resident cases.
- Form an outbreak management team to review the situation and provide guidance and support. Members of the team should include representatives from the affected unit/s.
- Review environmental and equipment cleaning practices.
- Collect specimens from residents that are contacts from the source (i.e., roommates) as well as others who were in close geographic proximity to the source.
- Consider screening staff contacts if the outbreak is due to the same strain of ESBL and new cases are identified despite precautions.
    - (i) Cohorting of residents and staff.
    - (ii) Consider closing a unit
    - (iii) Ensure that the laboratory is saving isolates of ESBL in case further tests are required (molecular typing).
    - (iv) The outbreak may be declared over by the team when there is evidence that no additional cases are occurring and that all additional precautions are being followed.
        i. At least 2 prevalence screens should be conducted on the affected unit, taken one week apart to verify that there are no new cases.

Reference:

Annex A: Screening, Testing and Surveillance for Antibiotic – Resistant Organisms (AROs) In All Health Care Settings 4th Edition. (PIDAC, February 2012).