


Number: 40-50
Title: Extended-spectrum β -lactamases (ESBLs)

	POLICIES & PROCEDURES Number: 40-50 Title: Extended-spectrum Beta-lactamases (ESBLs)
Authorization: [] SHR Regional Infection Prevention & Control Executive Committee	Source: Infection Prevention and Control Date Initiated: February, 2005 Date Reaffirmed: November 2011 Date Revised: June 10, 2016 Scope: SHR Agencies & Affiliates

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Introduction

ESBLs (Extended Spectrum Beta Lactamases) are a group of Gram-negative bacteria (predominantly bowel organisms), such as *Escherichia coli* and *Klebsiella*. These organisms produce enzymes (β -lactamases) that break down antibiotics (third and fourth generation cephalosporins such as Ceftazidime, Cefotaxime, Cefipime and Aztreonam) so they are ineffective. Infections follow the pattern of antibiotic-sensitive *E. coli* and *Klebsiella*, predominately associated with UTIs, wounds or sepsis. ESBLs are not more virulent than sensitive strains. People can carry ESBLs asymptotically without infection being present, this is colonization. Sites most often found to be colonized are the perianal/rectal areas. Client to client transfer of microorganisms via hands of health care workers is thought to be the main mode of transmission for ESBLs. Refer to [ESBL Fact Sheet](#).

Definitions

Cohort:

- Two or more clients colonized or infected with the same organism who are separated physically (i.e., in a separate room or ward) from other clients who are not colonized or infected with that organism.

Spatial Isolation:

- Separation by distance (minimum of 2 meters) and/or physical barriers (privacy curtains).

Policy

1. In addition to Routine Practices, use Contact Precautions for clients known or suspected to be infected or colonized with an ESBL.
2. **In acute care (Inpatient areas)** - In addition to Routine Practices, use Contact Precautions for contacts of newly identified positive clients that are known to be infected or colonized with an ESBL. Contacts are:
 - a. All roommates who have resided in the same room as the newly identified ARO client for 24 hours or greater.

- b. A client admitted (for 24 hours or greater) to the bed of a transferred or discharged client who is a newly identified ARO case prior to knowing their positive ARO status. See handout – [Contacts of an Antibiotic Resistant Organism – Client, Family & Visitor Information](#).
3. **In acute care (Outpatient areas including Emergency)** – If a client is identified as a contact of a newly identified positive client known to be infected or colonized with an ESBL, the client **is not placed** on additional precautions unless the client stay is greater than 24 hours. If the client's stay is 24 hours or greater and/or they are admitted, the client **is placed** on additional precautions. If the client is admitted to an inpatient area, the inpatient area needs to be informed that the client requires additional precautions (see "In acute care (Inpatient areas)"). Outpatient areas are required to proceed with screening of ESBL whenever possible. See [Appendix A – Retesting Process to Clear ESBL Positive Status](#).
4. **In long term care** - Consult with Infection Prevention and Control for direction of contacts of newly identified positive residents known to be infected or colonized with an ESBL.
5. In addition to Routine Practices, use Droplet and Contact Precautions for clients known to have ESBL in their sputum and in whom ESBL may be aerosolized during care. See Procedure #4.
6. In addition to Routine Practices, use Contact and Droplet Precautions for clients with a sputum positive culture.
7. Clients identified as ESBL positive will have their health records flagged at the direction of Infection Prevention and Control so that at each admission to the healthcare facility, appropriate additional precautions can be initiated.

Purpose

1. To protect the clients, visitors and healthcare workers by preventing and controlling the spread of ESBLs throughout the facility by identifying and interrupting the specific route of transmission.

Procedure

1. Identification of ESBL positive status in a client.
 - Nursing completes the [Screening for AROs - Admission Screening Medical Directive](#). Refer to [60-30 Screening for Antibiotic Resistant Organisms \(AROs\) – Medical Directives](#) Policy and Procedure in the Infection Prevention and Control Manual (Acute Care Only).
 - Identify clients placed on additional precautions by attaching an appropriate precaution sticker to the inside of the chart cover (Acute Care Only).
 - The additional precautions stickers can be ordered through Stores/Materials Management (Contact Precautions - SKU # 201037; Droplet Precautions - SKU # 201038; Airborne Precautions - Request by contacting Infection Prevention and Control).
 - Nursing will notify Infection Prevention and Control of out-of-region clients identified as ESBL positive.
 - Microbiology lab will notify Infection Prevention and Control and the nursing unit of the newly identified inpatients with ESBL.
 - Microbiology lab will notify Infection Prevention and Control and the attending physician of newly identified outpatients with ESBL.
2. Client Placement
 - Place the client in a single room with private bathroom.

- Post [Contact Precautions](#)* sign (SHR Printing Services #102106) or [Droplet and Contact Precautions](#)* sign (SHR Printing Services #102107).
- The dedicated Personal Protective Equipment (PPE) station must be placed away from any possible sources of contamination such as sinks and sharps containers.
- The dedicated PPE station such as a supply cart needs to be properly stocked and must be located outside the room. Supplies should include:
 - Outside the room:
 - Alcohol-based hand rub (ABHR)
 - Gloves (3 sizes)
 - Clean gowns
 - Hospital grade disinfectant
 - Inside the room:
 - Waste basket
 - Dirty linen hamper
 - ABHR
- Attach the additional precaution sticker to inside chart cover.
 - The additional precautions stickers can be ordered through Stores/Materials Management (Contact Precautions - SKU # 201037; Droplet Precautions - SKU # 201038)
- If a single room is unavailable using spatial isolation or cohorting may be necessary:
 - Post [Contact Precautions](#) sign or [Droplet and Contact Precautions](#) sign and [STOP](#)* sign on privacy curtain.
 - Keep privacy curtain pulled, if possible. The inside of the curtain is considered client environment and the outside of the curtain healthcare environment.
 - The cart with clean supplies is placed outside the privacy curtain, where gown, gloves and/or masks/face shields are donned.
 - The linen hamper and waste basket are placed inside the privacy curtain, where gown, gloves and/or masks/face shields are removed.
- If cohorting and/or using spatial isolation:
 - A. Place clients who are colonized or infected with the same organism (i.e., Klebsiella ESBL, E. Coli ESBL) together:
 - Cohort and spatially isolate the clients with the **lowest** risk of transmission
 - continent
 - good hygiene
 - skin lesions or wounds covered by dressings
 - able to control respiratory secretions
 - capable of self-care and able to comply with infection control precautions
 - Conditions that increase risk of transmission:
 - Presence of excessive wound drainage
 - Fecal incontinence
 - All other discharges (secretions & excretions from the body)
 - **Vulnerable clients to colonization or infection are those clients with:**
 - Severe diseases especially those who are immunocompromised or who have underlying medical conditions (i.e., organ transplant, hematopoietic stem cell transplant)
 - Special care (i.e., ICU, burn, hemodialysis, cystic fibrosis, and chemotherapy)
 - Recent surgery
 - Indwelling medical devices (i.e., urinary catheter, central venous line and endotracheal tubes)
 - Open draining wounds

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- B. Identify the ESBL clients with the least risk of transmission in private rooms and cohort them using spatial isolation (as noted above) in the same room. The client with the highest risk of transmission will be placed in a private room.
- C. Clients who are **NOT** colonized or infected with the same organism (i.e., Klebsiella ESBL, E. Coli ESBL):
 - Consult with Infection Prevention and Control

*****ESBL positive clients and ESBL negative clients should not share a bathroom*****

3. Hand Hygiene

- Perform hand hygiene as per [20-20 Hand Hygiene](#) policy in the Infection Prevention & Control manual using either alcohol-based hand rub (ABHR) or liquid soap and water.
- Client's hands should be cleansed before and after eating, and after going to the bathroom, assist the client if needed.

4. Personal Protective Equipment

a) Gloves and Gown

- Always perform hand hygiene before donning and doffing gloves and/or gown.
- Glove and gown for all direct contact with the client or the environmental surfaces.
- Choose a glove suitable for the task. Change gloves and perform hand hygiene after contact with infectious material that may contain high concentrations of microorganisms.
- Gowns are single use only. Remove immediately if wet.
- Perform hand hygiene before leaving the room.
- Avoid contact with environmental surfaces when leaving the room.
- See [20-150 Personal Protective Equipment - Donning and Doffing](#) policy.

b) Wear a mask/face shield when:

- The client has pneumonia and is sputum positive for ESBL.
- Suctioning and care of clients with a tracheostomy colonized or infected with ESBL.
- There is the likelihood of aerosolization from sputum positive for ESBL.
- There is the likelihood of aerosolization from wound drainage positive for ESBL.
- Always perform hand hygiene before donning and doffing mask/face shield.
- See [20-150 Personal Protective Equipment - Donning and Doffing](#) policy.

5. Client Transportation

- Ensure the Additional Precautions sticker is on the inside of the client chart.
- Notify receiving department that Contact Precautions or Droplet and Contact Precautions are required.
- Lay chart on clean towel if placing on client's lap or bed or bag chart.
- Glove and gown for transport of client and when anticipating direct contact with client.
- Don mask/face shield for transport of a client on Droplet and Contact precautions.
- Avoid contact with surfaces en route. Use elbow to push elevator buttons.
- Use clean sheet to cover client.
- When using unit's wheelchair disinfect before using for next client.
- Clean equipment with a hospital disinfectant.
- Transportation of the client to other departments should be limited to essential procedures only.
- Have client perform hand hygiene prior to leaving their room.

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- When leaving their room the client must have on a freshly laundered gown/housecoat. Gloves not required for clients.

6. Client Activities

- **Acute Care:** Limit client activities to necessary tests, therapies and exercise. Avoid common areas like kitchen, TV and play rooms. Refer to handout: [Contact Precautions – Client, Family & Visitor Information](#) or [Droplet and Contact Precautions – Client, Family & Visitor Information](#).
- **Long Term Care:** If bodily fluids positive for ESBL can be confined and contained, there is no need to restrict client's participation the facility therapies /activities. Assist client with hand hygiene prior to leaving the room.

7. Client Care Equipment

- Remove unnecessary items by limiting the amount of supplies taken into the room to avoid unnecessary waste at client's discharge.
- Dedicate noncritical client-care equipment to a single client (i.e., stethoscope, blood pressure cuff, tourniquet, vacutainer, laundry hamper stand, walker and commode).
- Any equipment that comes in direct contact with the client shall be wiped with a hospital disinfectant.
- If sharing of equipment is unavoidable clean and disinfect between clients.
- Dietary trays from clients on Contact Precautions or Droplet and Contact Precautions can be placed on dietary tray carts because the cart is washed after each use.
- Dietary trays from clients on Contact Precautions or Droplet and Contact Precautions left after pickup by Food and Nutrition staff should be bagged and left for pick up in a designated area.
- Gloves should be worn for pickup of dietary trays of clients on additional precautions

8. Visitors

- Instruct visitors regarding hand hygiene before and after client contact and/or entering or exiting the client room.
- Gowns and gloves are not required unless the visitor provides direct care (i.e., feeding, bathing, toileting, transferring, etc.). If client is ESBL sputum positive, visitors must wear a mask/face shield within 2 meters of client.
- Refer to the Information Handout – [Contact Precautions – Client, Family & Visitor Information](#) or [Droplet and Contact Precautions – Client, Family & Visitor Information](#).

9. Client and Family Teaching

- Clients should understand the nature of their infectious disease and the precautions being used, as well as the prevention of transmission of ESBLs to other clients, family and friends during their hospital stay and upon their return to the community. Provide the client information handout titled [Contact Precautions – Client, Family & Visitor Information](#) or [Droplet and Contact Precautions – Client, Family & Visitor Information](#).
- Infection Prevention and Control may be called to assist with education on ESBLs.
- Refer to [ESBL Fact Sheet](#).

10. Environmental Cleaning

- Room cleaning is performed while wearing PPE for additional precautions.
- Following discharge or discontinuation of precautions:

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- Contact Precaution sign or Droplet and Contact Precaution sign shall remain in place and Environmental Services will remove sign once cleaning completed.
- Wear PPE for Contact or Droplet and Contact Precautions.
- Privacy curtains should be changed.
- A precaution clean is performed for all clients who are on additional precautions.

11. Cultures

ESBL positive clients: Testing for Clearance:

- **Three** consecutive sets of negative samples from all colonized/infected body sites; (in most cases this would be a perianal swab if urine has been the original site), taken a week apart are required to remove from precautions. Refer to [Appendix A - Retesting Process to Clear ESBL Positive Status](#).
- After a client has tested positive for ESBL, we generally wait for at least 3 months before retesting.
- Clients who have had cultures done within the previous month do not require repeat cultures unless a new infection is present, the client's health has changed, or at the discretion of Infection Prevention and Control.
- Follow up cultures should be assessed on an individual basis in consultation with the Infectious Disease Physician and/or Infection Prevention and Control.

Other Considerations:

- Clients must be off antibiotics to which the ESBL is susceptible for at least 48 hours prior to swabbing. The usual antibiotics are Amoxicillin-Clavulanic acid, Ertapenem, Meropenem, Nitrofurantoin, Piperacillin-Tazobactam, Trimethoprim/Sulfamethoxazole (Cotrimoxazole, Bactrim, Septra).
- The use of antibacterial soaps (i.e., Chlorhexidine) should be avoided at least 48 hours before swabbing so as not to interfere with culture results.
- Cultures are to be taken from the perianal area as well as any other documented positive sites (i.e., wounds).
- If client has a stoma, obtain cultures from this site rather than perianal.
- When urine is the original positive site, always obtain a perianal swab, not urine.

Contacts of newly identified ESBL clients:

- **Two** consecutive sets of negative samples one week apart (perianal swab) are required to remove from precautions. Refer to [Appendix B – Testing Process for Contacts to a Newly Identified ESBL](#).

Admission Screening Cultures:

- Admission screens are a Medical Directive. See [60 - 30 Appendix A – Admission Screen Medical Directive](#).

Specimen Collection:

- See [60-30 Appendix C - Specimen Collection Guide](#).

12. Discharge of ESBL Positive Clients

- Instruct clients to report their ESBL status to any medical office or hospital.
- Ensure education is provided to the family, home care personnel or the receiving institution prior to the client's departure. Provide client with [Contact Precautions – Client, Family & Visitor Information](#) or [Droplet and Contact Precautions – Client, Family & Visitor Information](#) and [ESBL Fact Sheet](#).

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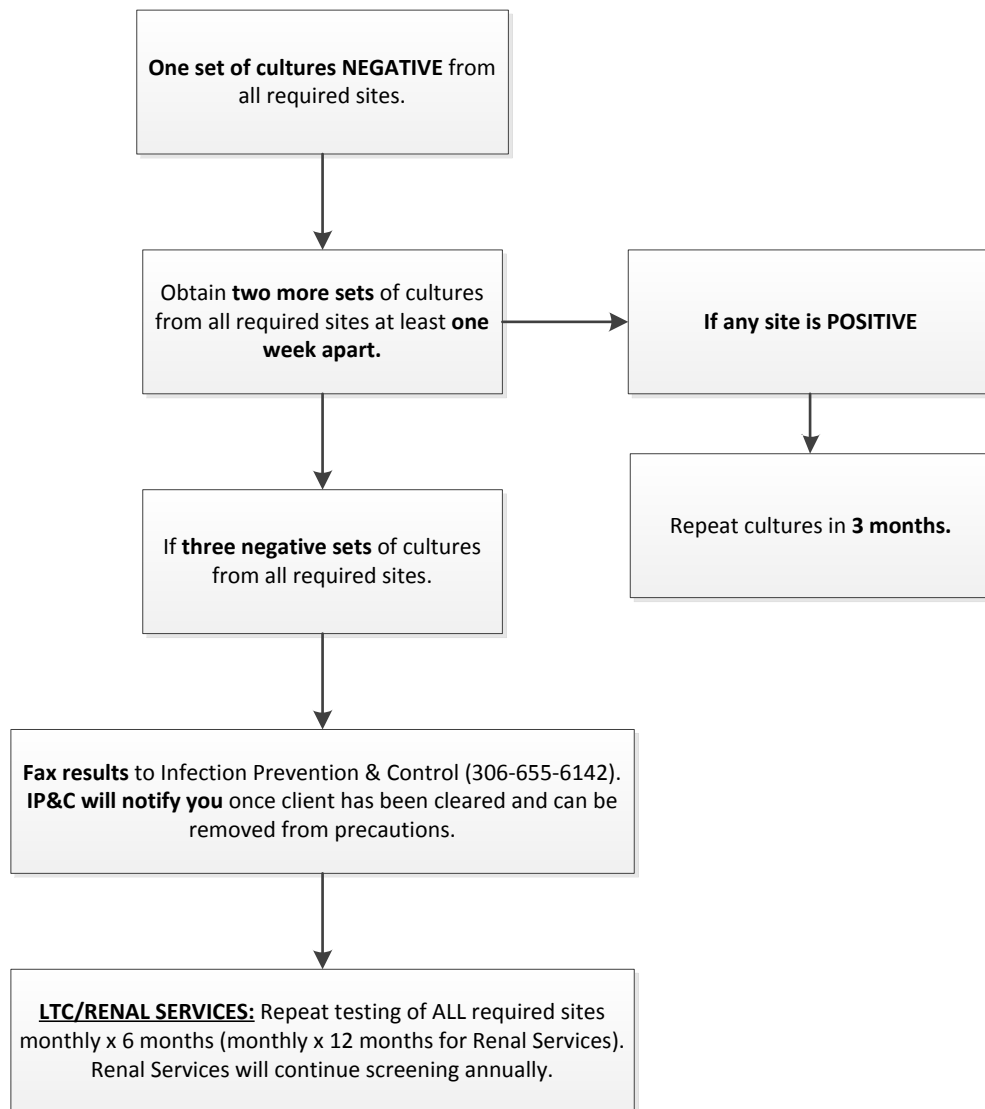
- On client transfer, inform receiving facility of client's ESBL status.
- See Environmental Cleaning (Section #10).

References

1. Center for Disease Control and Prevention (CDC). *Guidelines for isolation precautions in hospitals*. Hospital Infection Control Practices Advisory Committee (HICPAC), 1996;
2. Health Canada. *Infection control guidelines. Routine practices and additional precautions for preventing the transmission of infection in health care*. *CCDR* 1999; 25S4; 38-41.
3. Muller M.P. Beta-lactamase-mediated resistance in Gram-negative bacteria. *Infectious Diseases and Microbiology* 2004;3(6).
4. International Infection Control Council, *Best Infection Control Practices for Patients with Extended Spectrum Beta-Lactamase Enterobacteriaceae*, The Canadian Journal of Infection Control, Spring 2006.

60-30 Appendix D - ARO Retesting Process to Clear Positive Status

- Contact your Infection Control Practitioner (ICP) to determine when the retesting process can begin. Certain conditions may lead to delayed testing for clearance as they present a risk for continued colonization of the antibiotic resistant organism (ARO).
- **Wait at least 3 months (from the last positive date)** before retesting for MRSA, VRE or ESBL.
 - Ensure all treatment for infection (i.e., Urinary tract infection, pneumonia, etc.) is complete at least 48 hours before resting process begins.
- Ensure the client is taking **no IV or oral antibiotics, or using antibacterial soaps (i.e., Chlorhexadine soap) 48 hours before each set of cultures**, so as to not interfere with culture results.
- Required Testing Sites (See the [Specimen Collection Guide](#) for appropriate method of collection):
 - **Three sets** of cultures from **all documented positive sites** as well as the **usual screening sites** for the organism are required.
 - If testing for **MRSA, also swab ANY** wound* or device site**, even if it has not been positive in the past.



*Wound sites – include draining or open wounds/incisions

**Device sites – swab opening surrounding device

60-30 Appendix E – Screening Process for Contacts of AROs

