



**GUIDELINES FOR MANAGEMENT OF
ANTIBIOTIC RESISTANT ORGANISMS
ACROSS THE
CONTINUUM OF CARE**

**Department of Health & Community Services
Disease Control Division**

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Management of Antibiotic Resistant Organisms

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Section 1: Introduction

Purpose:

This guideline has been developed to provide evidence-based guidance for the prevention and control of antibiotic-resistant organisms (AROs) and to update the previous provincial document on the management of multidrug-resistant organisms (MDROs) developed in July 2007. These guidelines will apply to all sectors of health care including acute care, long term care and community care. A literature review by an expert panel indicates that there is no single approach to the control of specific AROs that is appropriate for all healthcare facilities (Cooper, 2003).

The severity and extent of disease caused by these pathogens varies by the population(s) affected and by the institution(s) in which they are found. Institutions vary widely in physical and functional characteristics, ranging from long-term care facilities (LTC) to specialty units (e.g., intensive care units [ICU], burn units, neonatal ICUs [NICUs]) in tertiary care facilities. Because of this, the approaches to prevention and control of these pathogens need to be tailored to the specific needs of each population and individual institution (Siegal et al., 2006). APIC (2010) experts recommend that efforts to eliminate AROs be guided by a comprehensive, facility-specific risk assessment which would be used to develop appropriate interventions.

Background:

Antibiotic-resistant organisms (AROs) are bacteria and that have developed resistance to antimicrobial drugs. Common examples of these organisms include: methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococci (VRE), gram negative organisms such as *Escherichia coli* and *Klebsiella pneumoniae* which produce extended spectrum beta-lactamase enzymes (ESBLs) and carbapenem-resistant Gram-negative bacilli. Infections with AROs have been associated with increases in length of hospital stays, morbidity, mortality and cost of health care (Carmeli, 2002; Cosgrove, 2003; Qavi, 2005; Cosgrove, 2006). A review of studies which identified risk factors for nosocomial colonization and infection with AROs found a commonality amongst risks for these organisms which include; advanced age, severity of illness, inter-institutional transfer of the patient, prolonged hospital stay, gastrointestinal surgery, transplantation, exposure to medical devices especially central venous catheters, and continued exposure to broad-spectrum antimicrobial drugs, especially cephalosporins (Safdar & Maki, 2002).

People infected with drug-resistant organisms are more likely to have longer and more expensive hospital stays, and may be more likely to die as a result of the infection (APIC, 2010). When empiric antibiotic treatment fails, patients require treatment with second or third choice drugs that may be less effective, more toxic, and more expensive. This means that patients with an antimicrobial-resistant infection may suffer more and have more costly treatment.

Transmission:

AROs are spread directly from person to person via the unwashed hands or indirectly, through contact with contaminated equipment and environmental surfaces. The most common method of transfer in healthcare settings is the hands of healthcare workers. Hands become contaminated when healthcare workers have close contact while caring for patients and residents especially those with wounds and devices. Healthcare workers (HCWs) who are colonized with AROs rarely transmit AROs directly to patients (Borlaug, 2005).

Section 2: Administrative Support

The reduction of the burden of ARO should be a goal that is supported by administrative and managerial leadership. The Canadian Patient Safety Institute's flagship program, Safer Healthcare Now!, recognizes that clear commitment and direction from the highest level of the organization is a critical component of work towards lessening the impact of AROs. Visible senior leadership support can lead to the removal of obstacles and the allocation of resources for implementing ARO strategies. Leadership commitment includes these elements:

- Acknowledgement that the prevention and control of AROs is a top priority for patient safety and that it requires annual reports which should include:
 - Incidence rates of AROs
 - Overviews of outbreaks
 - Actions in place to prevent and control transmission
- Adequate resources to develop and maintain infection prevention and control program including:
 - Sufficient numbers of Infection Control Practitioners
 - Availability of sufficient and appropriate equipment
 - Written infection prevention and control policies appropriate for the service provided
- Hand Hygiene as an institutional priority evidenced by:
 - A multidisciplinary program designed to improve adherence of health personnel to recommended hand-hygiene practices
 - Accessible sinks or an alcohol-based hand-rub product provided
 - Monitoring compliance with hand hygiene recommendations on a regular basis
- Educational opportunities for staff, patients and their families and visitors based on an organizational needs assessment
- Resources dedicated to ensure a comprehensive environmental cleaning program is in place
- Support for inter-Regional Health Authority cooperation by endorsement of provincial strategies that can be applied consistently across the continuum of care in all healthcare facilities in all geographic locations

Section 3: Education

Education has been recognized as one of the key strategies for any initiatives aimed at eliminating hospital-associated infections associated with AROs. Education about AROs should be provided to healthcare staff, patients and their families and visitors as appropriate. Education should be based on a needs assessment of each group.

Healthcare workers

The education program should include the basic competencies for infection prevention for healthcare workers plus specific education on AROs.

- All staff should receive education at orientation and periodically on core competencies for infection prevention and control

The core competencies include:

- Basic Microbiology including identification of AROs
 - Hand Hygiene
 - Routine Practices & Additional Precautions
 - Personal Protective Equipment
 - Personal Safety
 - Sterilization and Disinfection
 - Critical Assessment Skills
- Education on AROs should include:
 - Risk factors
 - Transmission
 - Prevention and control measures
 - Outcomes associated with AROs
 - Fact sheet for healthcare workers are provided on the following AROs:
 - Methicillin-resistant *Staphylococcus aureus* (MRSA) – Appendix A-1
 - Vancomycin resistant enterococcus (VRE) – Appendix A-2
 - Extended spectrum beta-lactamase (ESBL) producing bacteria – Appendix A-3
 - Carbapenem-resistant Gram-negative bacilli – Appendix A-4

Client/Family/Visitors

Education for clients/families and visitors should include information on the ARO and preventative measures which highlight sound personal hygienic practices.

- Hand hygiene awareness should be included in all educational programs
- A pamphlet, specific to the ARO, should be available to be used for the education of patients/residents, and their visitors and families
 - Fact sheet for clients, families and visitors are provided on the following AROs:
 - Methicillin-resistant *Staphylococcus aureus* (MRSA) – Acute Care Appendix B-1
 - Methicillin-resistant *Staphylococcus aureus* (MRSA) – Long Term Care Appendix B-2

- Community-associated methicillin-resistant *Staphylococcus aureus* – Appendix B-3
- Vancomycin-resistant enterococcus (VRE) – Appendix B-4
- Extended spectrum beta-lactamase (ESBL) producing bacteria – Appendix B-5
- Carbapenem-resistant Gram-negative bacilli – Appendix B-6

Section 4: Antibiotic Stewardship

Antibiotic stewardship has been defined as “the effective and responsible management of the use of antimicrobials in a given setting” (APIC, 2010). More than 70% of the bacteria causing hospital-acquired infections are resistant to at least one of the drugs most commonly used to treat them (CDC, 2001). In April 2011 the WHO declared that antibiotic resistance is not a new problem but one that is becoming more dangerous; they recommend urgent and consolidated efforts if we are to avoid regressing to the pre-antibiotic era.

The primary goal of antimicrobial stewardship is to optimize clinical outcomes while minimizing unintended consequences of antimicrobial use, including toxicity, the selection of pathogenic organisms (such as *Clostridium difficile*) and the emergence of resistance (Dellit, 2007). Collaboration among infection control, pharmacy, administrative, laboratory and medical staff is necessary to develop effective programs to ensure appropriate use of antibiotics. The Infectious Diseases Society of America (Dellit, 2007) has developed guidelines targeting acute care hospitals due to lack of research regarding effective interventions for the community. They recommend:

- An antimicrobial stewardship team consisting of an infectious disease (ID) physician and clinical pharmacist as essential members; other team members should include: clinical microbiologist, infection control professional, and hospital epidemiologist;
- The support and collaboration of hospital administration, medical staff and local providers in the development and maintenance of an antimicrobial stewardship program is essential;
- Conducting prospective auditing of antimicrobial use with direct interaction and feedback to the prescriber. It may also be beneficial to implement formulary restrictions and preauthorization requirements;
- Formulary restriction and preauthorization requirements which can lead to immediate and significant reductions in antimicrobial use and cost;
- Education to influence prescribing behavior is essential, however it is only marginally effective without the incorporation of active interventions;
- Developing evidence-based practice guidelines that incorporate local microbiology and resistance patterns;
- Utilizing antimicrobial order forms;
- Streamlining or de-escalation of empirical antimicrobial therapy on the basis of culture results can effectively target the causative pathogen, resulting in decreasing antimicrobial exposure and substantive cost savings;
- Antimicrobial dose optimization based on individual patient character, causative organism, site of infection, and pharmacokinetic and pharmacodynamic characteristics of the drug;

- A systematic plan for parental to oral conversion of antimicrobials when the patient's condition allows, can decrease length of hospital stay and healthcare costs;
- Healthcare information technology in the form of electronic medical records and clinical decision support. Computer-based surveillance can facilitate good stewardship by more efficient targeting of antimicrobial interventions, tracking of antimicrobial resistance patterns, and identification of nosocomial infections and adverse drug events;
- Involvement of the clinical microbiology laboratory which plays a critical role in antimicrobial stewardship by providing patient-specific culture and susceptibility data to optimize individual antimicrobial management and by assisting infection control efforts in the surveillance of resistant organisms.

Section 5: Risk Assessment and Screening

Risk Assessment

Performance of an organization specific ARO risk assessment will result in the establishment of a baseline description of these organisms for the Regional Health Authority (RHA) and will help identify patient populations that are more likely to be colonized or infected with AROs. Information from surveillance data for the organization can be the key to knowledge of incidence and transmission risks within the RHA.

The purpose of a risk assessment is to evaluate the degree or magnitude of ARO transmission of healthcare associated infection risk within the facility. The completed risk assessment is used to develop facility and unit-specific strategies to reduce transmission and infection risk for patients/residents, staff and visitors.

Criteria to guide risk assessment;

- The risk assessment is part of the IPAC program's assessment of the potential for the spread of infection within the facility
- Risk assessment is based on identified risk groups/population/location, surveillance data evaluation, prevalence calculations, and incidence rates.
- The risk assessment is reviewed and updated annually.

Screening

There are different strategies used in different facilities for screening for AROs; including

- Universal active surveillance testing (AST) – the testing of all patients admitted to a facility
- Targeted screening of high risk areas such as screening all patients admitted to a certain unit
- Targeted screening of high risk patients – screening of patients who have been identified as being in a high risk group

Targeted Screening

In Newfoundland and Labrador targeted screening of high risk patients is recommended for MRSA and VRE. A risk assessment should be done by the Regional Health Authority to determine the hospital's incidence of antibiotic resistant organisms and to identify the patient populations that are more likely to be colonized and/or infected with

them. Targeted screening should be linked to planned interventions to reduce the risks for these patients.

Regional screening recommendations may vary based on a review of local epidemiology and evidence from surveillance data which indicated that a certain patient population (e.g., ICU or Dialysis Unit) is at high risk for AROs. When implementing surveillance testing it is important to consider the following items:

- Administrative support
- Technical (IT) support
- Pharmacy support
- Medical and clinical staff supports
- Availability of resources (supplies and personnel)
- Preparation of the laboratory and reducing the turnaround time for screening tests
- Infection prevention and control staffing and/or hours assigned to infection prevention and control
- Public health support as applicable
- Current infection prevention and control interventions (e.g., hand hygiene, Contact Precautions, etc.)
- Measurement parameters for the current interventions
- Procedures in place to measuring important outcomes that can evaluate the effectiveness of a screening program

Section 6: Surveillance

The purpose of surveillance is to identify trends, outbreaks and an increased incidence of AROs in the population and to disseminate this information to those who require it for their practice. At present in Newfoundland and Labrador there is a provincial surveillance protocol for methicillin-resistant *Staphylococcus aureus*. The protocol is available at:

http://www.health.gov.nl.ca/health/publichealth/cdc/healthcare_associated_surveillance.pdf

The goal of the provincial MRSA surveillance program is to determine the epidemiology of MRSA and to determine the incidence and burden of illness association with MRSA. A database has been provided to each Regional Health Authority (RHA) to collect this data. Reports have been provided to the province since January 2009. This information is then shared with RHAs who in turn inform their health professionals who require such information.

In each Regional Health Authority a surveillance system is maintained by the Infection Prevention and Control Program in partnership with Communicable Disease Control to collect data on AROs such as MRSA and VRE. Patients identified with a positive laboratory specimen for MRSA and VRE are flagged so that on future admission or readmission to the facility the patients will be placed on Contact Precautions.

Section 7: Infection Prevention and Control Measures

The use of Routine Practices for all patients and Contact Precautions for patients colonized or infected with AROs is recommended for decreasing the transmission of AROs in the hospital setting. Transmission of AROs directly from infected and colonized patients and indirectly via contaminated equipment, supplies, and environmental surfaces in patient rooms has been documented.

Role of the Laboratory

A system should be in place in the microbiology laboratory to ensure prompt notification of staff when an ARO is identified.

- Microbiology laboratories should use the standardized laboratory methods established by the Provincial Public Health Laboratory for testing for AROs
- If the patient with the ARO is an inpatient at the time of diagnosis, the laboratory should notify a nurse on the patient care unit
- The nurse-in-charge of the Unit is responsible for ensuring that the physician is notified and the required precautions are implemented
- The laboratory staff should notify the Infection Control Service

Disclosure to Patients

The Personal Health Information Act (PHIA) defines “disclose” as “to release or make available personal health information that is under the control or custody of a health information custodian, or its employee or agent, to another custodian, individual or organization.” PHIA recognized the need for a flexible approach to regulating information exchanges between custodians of health information in order to ensure the effective and efficient operation of the health system. Identification and knowledge of ARO status is a part of an organization risk assessment to guide development of infection prevention and control programs. The process for identification and informing the patient is as follows:

- The patient should be advised of their ARO status by a qualified healthcare professional providing advice about the management and follow-up care
- The information can be given in the hospital or long term care facility by the nurse or physician (See Appendix B for specific ARO fact sheets)
- If the patient is discharged or is an outpatient, the process for informing the patient will be according to the disclosure policy of the RHA. To facilitate this notification a sample letter to the family physician is included in the Appendix D-2.

Decolonization

Decolonization therapy refers to the use of topical, oral and/or systemic antibiotic agent to remove resistant bacteria from a colonized individual. It has been described specifically for MRSA. A Cochrane Review on the use of antimicrobials for decolonization of MRSA (Loeb, 2003) reported the following findings:

- There is insufficient evidence to support the use of topical or antimicrobial therapy for eradicating nasal or extra-nasal MRSA

- No one type of treatment either topical or oral or a combination of both showed a superior effect
- Potentially serious adverse events and development of antimicrobial resistance can result from therapy

Additionally Simor (2007) indicated that mupirocin, a commonly used decolonization agent, has been shown to have high level of resistance to *Staphylococcus aureus* which has been associated with treatment failure. There may be specific individuals who may benefit from decolonization therapy. Therefore, if decolonization is being considered the following recommendations should be followed:

- Decolonization should be initiated by the patient's physician in consultation with an Infectious Disease Specialist
- Routine decolonization of a MRSA colonized patient is not recommended
- Routine decolonization is not considered a routine infection prevention and control strategy (APIC, 2010)

Decolonization therapy is not recommended for other AROs at this time.

Discontinuing Precautions

There are insufficient data at present on which to base recommendations for discontinuation of precautions for patients colonized with antibiotic resistant organisms. Decisions will need to be made locally taking into consideration the specific microorganism, that patient population and local experience with duration of colonization (PHAC 2010).

Methicillin-resistant *Staphylococcus aureus* (MRSA)

Hospitals have developed protocols for discontinuing Contact Precautions when a patient's infection has resolved and there are several negative screening cultures in the absence of antibiotics to demonstrate that the patient is no longer colonized with MRSA. If a Regional Health Authority is considering a policy for the discontinuing of precautions for patients colonized or infected with MRSA it is advisable to consult with an Infectious Disease Specialist, an Infection Control Practitioner, and members of the Infection Control Committee. Vikram's study (2010) found that the following criteria could be helpful in determining if a patient is a suitable candidate for discontinuing Contact Precautions:

- Client should not have open wounds and no drains or tubes in place
- Client should not be a resident of a long term care facility
- Client should not be on antibiotics or should not have had antibiotics in the previous 72 hours
- Client should not have had a positive MRSA culture within the last six months. The longer the interval from the most recent positive result for MRSA is significantly related to negative screening results
- Client should have three negative cultures taken on three separate occasion with a minimum of 48 hours between the times of the cultures
 - Culture both nares with one swab
 - If all three sets of cultures are negative the person can be considered negative and the precautions can be discontinued

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The MRSA alert would remain on the patient's chart and on readmission to the healthcare facility the patient would be placed on Contact Precautions and screened for MRSA. If the screening result was negative; the precautions would be discontinued but the alert would remain in place.

Vancomycin-resistant enterococcus (VRE)

Bowel colonization with VRE may persist for long periods.

In acute care:

- Patients with VRE should be considered to be colonized for the duration of the admission
- Patients identified as having VRE colonization should be placed on Contact Precautions. On readmission to hospital may be candidates for the discontinuation of precautions if there has been a minimum of three negative cultures with at least one culture taken three months after the last positive culture.

Extended spectrum beta-lactamase (ESBL) producing bacteria

It is not known how long bowel colonization with ESBL-producing bacteria persists. If a patient has been put on Contact Precautions for an ESBL infection the precautions should remain in place until the infection has been treated and the patient is no longer symptomatic.

Carbapenem resistant-Gram-negative bacilli (CRGNB)

Evidence based criteria for discontinuing Contact Precautions for CRGNB in acute care settings have not been developed; organizations should be cautious in discontinuing precautions. In most cases precautions should continue for the duration of the hospitalization during which the CRGNB was first isolated. Patients readmitted within 12 months of that hospitalization should be considered probably colonized and managed with Contact Precautions.

Acute Care

Admission

Admissions or transfers to acute care facilities should not be delayed nor denied on the basis of ARO status.

Patient Placement/Accommodation

A single room with a private bathroom is preferred. The door may remain open.

- Perform a risk assessment to help determine placement options for the patient (Appendix C)
- If a private room is not available:

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- Priority for the single rooms should be given to patients who have conditions which may facilitate transmission (e.g., uncontained secretions or excretions)
- Ensure the patient is not infected with other potentially transmissible microorganisms
- Ensure the patient is not severely compromised or does not have the following conditions: varicella (primary chickenpox), zoster, *Neisseria meningitidis* infection, *Haemophilus influenzae* type B, tuberculosis, measles, HIV or cystic fibrosis
- Contact the Infection Control Practitioner/Patient Care Supervisor to discuss the cohorting of patients
 - Cohort patients who are infected or colonized with the same microorganism
 - Select patients on their ability and the ability of their visitors to follow required precautions
 - Make certain the patient has good hygiene; good respiratory etiquette and any draining wounds can be contained by dressings
 - In a shared room, a patient with diarrhea should not share a toilet with another patient
 - Avoid placing a patient requiring Contact Precautions in the same room as a patient who is at high risk for complications if an infection occurs or with conditions that may facilitate transmission (e.g., those who are immunocompromised, have open wounds)
 - Each patient in the cohort is on Contact Precautions and staff must remove personal protective equipment between patients
 - Items used between patients should be cleaned and disinfected or dedicated equipment should be used
 - If cohorting is not possible, place patients with AROs in rooms with patients at low risk of ARO acquisition (e.g., good hygiene and good respiratory etiquette)

Hand Hygiene

Hand hygiene is one of the key strategies for the prevention and reduction of AROs.

- Perform hand hygiene before and after contact with the patient or with the patient's environment

Contact Precautions

Contact Precautions should be implemented for all patients who are colonized or infected with AROs.

- For long-stay patients (e.g., longer than two months) an individualized care plan should be developed by the Patient Care Unit staff and the Infection Control Practitioner

Environmental Cleaning

It has been demonstrated that environmental surfaces around a patient colonized or infected with an ARO can be an important source for colonization of the healthcare workers' hands (Bhalla, 2004; Boyce, 2002). Suboptimal cleaning protocols have been associated with outbreaks of AROs (Corcoran & Kirkwood, 1999). Patients and healthcare workers can transmit and/or acquire AROs from contact with contaminated environmental surfaces. All healthcare workers have a responsibility for maintaining a clean, safe patient environment; however, the overall maintenance of a clean, safe healthcare environment is the responsibility of Environmental Services staff (EVS). Well-

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done surface cleaning and disinfection is one of the most important ways to prevent and control healthcare-associated infections. Recommendations for EVS include:

- Initial training on cleaning and disinfection procedures, reinforcement of best practices and annual competency review for staff
- Policies and procedures should specify how, by whom and when environmental surfaces are cleaned
- Monitoring of cleaning procedures which should include an assessment of the cleaning surfaces nearest to the patient; including bedrails, call lights, doorknobs, beside commodes, faucet handles and chairs
- Use of environmental cleaning checklists
- Photographs of “high touch” or frequently touched items in a room to cue EVS staff and to ensure more consistency in room cleaning
- In cohort situations housekeeping activities should increase to a minimum of twice a day

No special environmental cleaning techniques are advocated for organisms such as methicillin-resistant *Staphylococcus aureus*, Vancomycin-resistant enterococci, or resistant gram negative bacteria (Health Canada, 1999)

Management of dishes, laundry and waste

No special requirements are required for the handling of dishes, laundry and waste.

- Follow Routine Practices

Patient transport

- Limit transport of patient from room for essential purposes only
- Follow the individualized care plan for long-stay patients regarding out of room activities
- Notify receiving area of the need for Contact Precautions
- Ensure patient has a clean gown on and has hands washed before leaving the room
- Draining wounds should be contained in a dressing
- If direct patient contact is anticipated during transport, the staff member should wear a gown and gloves
- The wheel chair or stretcher should be cleaned and disinfected after use

Family and Visitors

Education of the family/visitor regarding the ARO should be provided after consultation with the patient regarding confidentiality issues. Information on the specific ARO should be discussed with the patient/family using fact sheets from Appendix B.

Family and visitors should follow the recommendations on the Contact Precautions sign.

- They should be shown the proper procedure for hand hygiene
- Family members who provide direct care should be advised to wear gown and gloves
- If documentation of the discussion is required Appendix D-1 provides a template

Treatment

The treatment for an ARO infection will be determined by the attending physician.

Patient Care Equipment

Dedicate the use of non-critical items (stethoscope, B/P cuff, dressing supplies, creams/lotions, etc.) to single patient use.

- Keep supplies in the room to a minimum
- Label and use one wheelchair, walker, or commode for the patient
- Keep this equipment in the patient's room until no longer needed
- Clean all equipment removed from the patient's room with a hospital-approved low level disinfectant

Screening of Contacts

- If the patient was in a multi-bed room prior to being diagnosed with an ARO, the Infection Control Practitioner should be consulted regarding the need to screen the roommates
 - Screen those who have been roommates of the case for ≥ 48 hours
- For culture procedure see Appendix E
- If two or more patients are identified on the same Unit at the same time the Infection Control Service should determine if Outbreak Management is required
- A review of the infection control practices on the Unit is recommended
 - If screening of other patients is required, a script for staff to use is available in Appendix F

Occupational Health

The risk of ARO acquisition by healthcare workers is considered low when they follow Routine Practices and perform hand hygiene appropriately.

- The routine screening of a HCW is not recommended unless the person is deemed epidemiologically linked to an outbreak of an ARO
- If a HCW has been colonized or infected by an ARO an occupational health professional, infection control practitioner and/or infectious disease physician should be consulted to develop an individualized follow-up plan

Operating Rooms

Communication of the patient's need for Contact Precautions is necessary for the prevention of the spread of AROs within the Operating Room (OR). If Contact Precautions can be implemented the patient does not need to be deferred till the last case of the day. The Operating Room Nurses Association of Canada (2011) recommends following the facilities policy for Contact Precautions. These include:

- Remove all unnecessary supplies/equipment from the OR
- Remove any necessary supplies to be used in the case from drawers/cupboards and ensure that the drawers/cupboards are closed
- Only have supplies to be used for the case on the anesthetic cart
- When possible transport patients directly to the OR
- Only required staff should be in the OR
- Designate a clean area in the OR for charting

Ambulatory Settings

Ambulatory care services include settings such as Medical and Surgical Clinics, Dentistry, Endoscopy, Day Surgery and other similar areas. Services in these settings

range from noninvasive history and physical examinations to complete immunotherapy, chemotherapy and blood transfusions

- In ambulatory settings, use Routine Practices for patients known to be infected or colonized with target AROs
- Use gloves and gowns for contact with uncontrolled secretions, pressure ulcers, draining wounds, stool incontinence, and ostomy tubes and bags
- Limit the supplies and equipment in the procedure rooms to prevent cross contamination of clean and sterile supplies

Long Term Care

AROs are frequently being recovered in long term care facilities. Rather than focus on practices which may impede the social interactions of residents, staff, family and visitors, it is prudent to treat all residents as potentially colonized (Bonomo, 2000).

Practices to prevent transmission should focus on antibiotic restriction practices, nontreatment of asymptomatic bacteriuria, minimal use of topical antibiotics, hand hygiene and Contact Precautions for wound care, and regular education of healthcare workers.

Admission

The admission of a resident to LTC should not be denied on the basis of ARO status. If there are any infection prevention and control concerns relating to the admission, request a consultation with an Infection Control Practitioner (ICP). The attending physician and the resident's care team should be aware of the resident's ARO status.

- Every colonized/infected resident should be individually assessed on admission according to the type of ARO and for risk factors that may increase dissemination and/or facilitate transmission of AROs. These include factors such as:
 - Exfoliating skin condition
 - Large wounds or lower respiratory tract infections
 - The site of colonization or infection
 - The resident's hygiene and cognitive ability
- Additional Precautions may be indicated for a resident who is identified as posing a short-term risk to another resident
 - These Additional Precautions should last as long as the resident continues to have secretions or excretions that cannot be contained

Resident Placement/Accommodation

A private room is preferred but is not necessary. If the resident is admitted to a multi-bed room, it is preferable that roommates not be at higher risk of infection (e.g., open wounds, invasive devices, severely immunosuppressed). Perform a risk assessment to help determine placement options (Appendix C).

- Colonized patients should not be excluded from any group activities, dining or social events
- Infected patients should be individually assessed, in consultation with the Infection Control Practitioner (ICP), to establish the precautions required for duration of the infection
- Roommates and their families do not need to be advised of the colonization status of a resident with an ARO

- If roommates and their families require further information on AROs, contact the Infection Control Practitioner

Infection Precautions

Routine Precautions are required for the care of all residents including those with AROs.

- Residents whose infected secretions or drainage cannot be contained will have a sign indicating that Additional Precautions (i.e., Contact) are required
 - Gloves should be used when contact with secretions and excretions are anticipated
 - Remove gloves and wash hands after providing care
 - Gowns and eye protection should be used as indicated in Routine Precautions
- If skin lesions are present:
 - Cover lesions with appropriate dressings to contain drainage or exudates, and ensure that appropriate medical care has been received
 - Never share creams, lotions, soaps, cosmetics and other personal products that are in contact with the skin
- Hand Hygiene
 - HCWs should wash their hands before and after providing care to a resident, after handling body secretions or touching contaminated equipment and environmental surfaces
 - If residents are to perform self-care, they should be taught, encouraged and reminded of the importance of hand hygiene before leaving their rooms for common areas and before eating or preparing food
 - Residents who are unable to assume responsibility for self-care should be assisted in washing their hands
 - Volunteers and visitors should be encouraged to wash their hands
 - On entry to the building and when leaving the building and
 - Before and after contact with a resident
- Housekeeping should be done on a scheduled daily basis
- No special precautions required for dishes, laundry, or waste disposal

Patient Care Equipment

- Dedicate equipment (wheel chairs, walkers, etc.,) to single resident use (if possible) regardless of ARO status
- Equipment should be cleaned on a regular scheduled basis, when visibly soiled and before use on another resident
- The bathtub and tub chair lift should be cleaned and disinfected after each use
- Slings should be single use or should be laundered before use on another resident

Screening and Decolonization

- Routine screening for AROs is not recommended
- If a resident is identified with nosocomial ARO colonization or infection further investigation is warranted
- Screening of roommates is not recommended
- Decolonization therapy is not recommended

Transfers to Acute Care Settings

Certain residents may be screened for AROs if a transfer to acute care is required. This will depend on the RHA's risk assessment for AROs.

- Information on the resident's ARO colonization or infection should be communicated to a receiving facility prior to the transfer

Community Care

There has been a dramatic shift of healthcare delivery from the hospital setting to the community over the past several decades. All healthcare settings should make infection prevention and control a priority. The fundamental elements needed to prevent infections in the community include administrative support and awareness of the recommendations required for the individual with the ARO and the precautions recommended for staff in settings such as schools and daycares

Administrative Support

An infection prevention and control program should be in place with written policies and procedures appropriate for the service.

- Infection prevention and control education and training should be provided for all staff at orientation and repeated regularly
- Hand Hygiene practices should be supported by appropriate infrastructure
- Personal protective equipment should be available to staff
- Occupational Health education should be provided on safe injection practices
- Policies should be in place for the cleaning and disinfection of reusable medical equipment

Precautions for Staff

Staff should be knowledgeable about AROs including the epidemiology, concepts in transmission, and prevention and control strategies.

- Hand hygiene should be performed before and after each client contact or contact with the client's environment
- Gloves should be used for contact with uncontrolled secretions, pressure ulcers, draining wounds, stool incontinence, and ostomy tubes/bags
- Gowns may be required as recommended with Routine Practices

Precautions for Individuals with AROs

Individuals should follow basic practices for good hygiene at all times and in all settings. These include, but are not limited to the following:

- Regular hand hygiene to limit personal contamination and transmission
- Regular bathing with soap and water
- If skin lesions are present:
 - Cover lesions with appropriate dressings to contain drainage or exudates and ensure that appropriate medical care has been received
 - Do not share creams, lotions, soaps, cosmetics, and other personal products that are in contact with the skin
 - Do not share towels with other members of the family
 - Do not share personal items that come in contact with the skin lesions such as razors, toothbrushes, towels, nail files, combs and brushes

Management of Antibiotic Resistant Organisms

- Discard contaminated waste, including used dressings in a safe and timely manner to avoid exposure to other individuals
- Wash hands with soap and water after touching any skin lesions and potentially infected materials such as soiled dressings
- The household environment should be regularly cleaned with a standard household cleaner
- Clothes and linens from individuals who are ARO positive can be included in the regular household laundry
- Usual laundry washing and drying destroys most potentially pathogenic bacteria
- Cutlery and dishes may be washed in the usual manner with other household utensils using soap and hot water or a dishwasher
- Advise individuals who are deemed colonized or infected with an ARO to inform healthcare professional of their ARO status at the time of contact with the health care systems

Precautions for Schools and Daycares

Students and staff members who are colonized or infected with AROs do not need to be excluded from the classroom. School exclusion for an infectious disease should only be done on the recommendation of the Medical Officer of Health.

- It is not necessary to inform the school community about an ARO infection or colonization
- Education should be provided to school faculty, students and families on general hygienic practices on an ongoing basis
- Hand hygiene is the single most important way to prevent the spread of any infection and a focus on hand hygiene should be incorporated into the culture of the school and childcare environment
 - Infrastructure to support Hand Hygiene should be available including:
 - Scheduled education session for staff and students
 - Signage to support and encourage the practice
 - Adequate number of sinks, soap, and paper towels
 - Hand sanitizers in appropriate locations if access to sinks/water is limited
- Environmental Services
 - Cleaning of the environment is critical to the containment of infectious diseases
 - Scheduled cleaning regimes should be in accordance with the policy of the facility
 - Audits should be done of the cleaning to ensure that the correct procedures are being followed

Correctional Facilities

Settings such as prisons which house a large number of people for extended periods of time have the possibility of spreading communicable diseases. Community-associated MRSA has been associated with unsanitary tattoo practices and poor inmate hygiene in the prison system. MRSA transmission has been linked to inmates sharing soap or towels with one another, infrequent showering and inmates lancing boils with fingernails or tweezers. These practices can also lead to infection with other resistant organisms. Primary prevention measures should include:

Administrative Support

An infection prevention and control program should be in place with written policies and procedures appropriate for the service.

- Infection prevention and control education and training should be provided for all staff at orientation and repeated regularly
- Hand Hygiene practices should be supported by appropriate infrastructure
- Personal protective equipment should be available to staff
- Occupational Health education should be provided on safe injection practices
- Policies should be in place for the cleaning and disinfection of reusable medical equipment
- Environmental Services
 - Cleaning of the environment is critical to the containment of infectious diseases
 - Scheduled cleaning regimes should be in accordance with the policy of the facility
 - Audits should be done of the cleaning to ensure that the correct procedures are being followed

Precautions for Inmates

A focus should be on prevention which involves basic measures to prevent ARO infection and transmission within a prison. Basic measures to consider are:

- Assessment
 - All inmates undergoing intake medical screening and physical examinations should be carefully evaluated for skin infections
 - All inmate food handlers should be advised on the necessity of self-reporting of any infections especially skin infections
- Education
 - Inmates should be provided information on methods of transmission and containment of infections, such as AROs, to include:
 - Hand Hygiene practices
 - General hygiene
 - Cleaning of environment

Section 8: Outbreak Control

Outbreak Recognition and Control

The prevalence of a given organism is often used to characterize and determine endemic versus epidemic level of the organism's presence in an environment or location. The appearance of a single case of an ARO in an area with no previously identified cases should prompt the timely implementation of selected control measures. The appearance of two or more temporally or geographically associated AROs should evoke a heightened response. A consultation with the Infection Control Practitioner is recommended and further investigation is required. If an outbreak is suspected or confirmed additional control measures may be necessary. The first step would be to place the patient on Contact Precautions while further investigation is being done. The next step would be to activate an Outbreak Management Team. The Regional Medical Officer of Health should be informed of the outbreak. The OMT will provide directions on infection prevention and control measures.

Critical Elements in the Control of ARO Outbreaks are:

- Administrative Support
- Public Relations/Communications
- Education
- Hand Hygiene
- Surveillance
- Environmental Measures
- Enhanced Infection Prevention and Control Practices

Administrative support

- Provide representation on the OMT
- Ensure that necessary funding is available to implement the recommendations
- Require a daily report for senior management
- Evaluate the goals of the OMT at a specified time

Public Relations/Communications

- It is critical to have an identified media contact person during an outbreak
- The OMT will appoint the person who will be responsible for clinical updates
- Updates should be provided on the progress and effectiveness of intensified interventions during outbreak management

Education

More frequent education sessions should be provided for staff who work in the area experiencing the outbreak

- Provide fact sheets to staff, patients and visitors

Hand Hygiene

- Ensure the availability of hand hygiene products in the area of the outbreaks
- It may be advisable to review the hand hygiene practices of staff at this time

Surveillance

- Provide prevalence and incidence rates for the specific area of the ARO causing the outbreak.
- Determine the type of active surveillance cultures to be done during the outbreak
- Share the information learned with those who require it for their practice

Environmental Measures

- Ensure that representatives from the Environmental Services, responsible for the area where the outbreak is occurring, are members of the OMT
- Dedicate sufficient resources to guarantee that the work can be done in an efficient and timely manner
- Intensify and reinforce training of the housekeeping staff working in the targeted area
- Clean all horizontal and frequently touched surfaces at least twice daily and when soiled
- Consider dedicated staff to work in the area
- Closely supervise the work

Management of Antibiotic Resistant Organisms

- If sustained efforts to manage the outbreak fail to produce significant results, it may be necessary to vacate the unit in order to facilitate intensive cleaning
- Review the equipment being used for the care of the client and determine if cleaning/disinfection practices are adequate

Enhanced Infection Prevention and Control

- Decisions re the use of Contact Precautions for all patients/residents on a Unit should be discussed with the OMT
- Use of Contact Precautions during the period of awaiting the results of active surveillance cultures
- Provide a daily report to the OMT on the issues related to the outbreak
- Consider stopping new admissions to the Unit if transmission continues despite the implementation of the enhanced control measures

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Glossary of Terms

Acute Care: Health care provided in acute care facilities.

Cohorting: The practice of grouping patients/residents infected or colonized with the same infectious agent together to confine their care to one area.

Colonization: A microorganism is present in or on the body but is not causing disease.

Community Care: Health care provided in the home, doctor's offices, clinics and other ambulatory clinics outside of the Acute or Long Term Care settings.

Hand Hygiene: A process for the removal of soil and transient microorganisms from the hands. Hand hygiene may be accomplished using soap and running water or the use of alcohol-based hand rubs. Optimal alcohol strength should be 60 – 90 %.

Healthcare associated infection: An infection that develops in a patient/resident who is cared for in any healthcare setting; Acute Care, Long Term Care, or Community Care and is felt to be related to receiving health care.

Healthcare worker (HCW): All paid and unpaid person who work in a healthcare setting.

Infection: A microorganism is present in or on the body, has invaded tissue, and is causing signs and symptoms of disease.

Long Term Care: Health care provided in nursing homes, hostels, group homes, personal care homes, psychiatric facilities, rehabilitation facilities, transition units, and palliative care units.

Routine Practices

The Practices recommended by the Public Health Agency of Canada (PHAC) to describe infection prevention and control guidelines recommended in Canada to prevent and control the transmission of microorganisms in health care settings from recognized and unrecognized sources (PHAC draft 2010).

The components of Routine Practices include:

- Hand Hygiene
- Point of Care Risk Assessment
- Patient Placement/Accommodation
- Personal Protective Equipment
- Patient Care Equipment
- Environmental Equipment

Contact Precaution

- Contact Precautions are recommended for the prevention of transfer of microorganisms by the direct and indirect route
- Direct contact results from direct physical contact between an infected or colonized individual and a susceptible host

Management of Antibiotic Resistant Organisms

- Indirect contact involves passive transfer of microorganisms to a susceptible host via an intermediate object, such as contaminated hands. For further information on Routine Practices and Contact Precautions refer to Health Canada (1999) document.

Appendices

APPENDIX A-1

METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA) Fact Sheet for Healthcare Professionals

What is MRSA?

Staphylococcus aureus is a bacterium that periodically lives on the skin and mucous membranes of healthy people. When *Staphylococcus aureus* develops resistance to the beta-lactam class of antibiotics, it is called methicillin-resistant *Staphylococcus aureus* or MRSA.

How is MRSA spread?

MRSA is spread from one person to another via the hands of healthcare workers. Hands are easily contaminated during the process of care-giving or from contact with environmental surfaces in close proximity to the patient.

Colonization and Infection

Colonization occurs when bacteria are present on or in the body without causing clinical signs or symptoms of disease.

Infection occurs when bacteria enters a body site and multiplies in tissue causing clinical manifestation of disease. This is usually evident by fever, a rise in white blood cell count, or purulent drainage from a wound or body cavity.

Risk factors for MRSA Infection

MRSA infection usually develops in hospitalized clients/patients/residents who are elderly or very sick (weakened immune systems). Other factors that increase the risk for acquiring MRSA infection include:

- Being colonized with MRSA
- Previous hospitalization or transfer between health care facilities (in Canada or outside Canada)
- Presence of an indwelling device

Good Hand Hygiene Practices

Remind all staff and visitors to practice good hand hygiene before and after client/patient/resident contact/care. Health care staff should review the correct method of hand hygiene, as well as demonstrate the proper donning/removal of personal protective equipment (PPE) to clients/patients/residents families and visitors.

Good hand hygiene practices refer to the use of alcohol based hand rub or soap and running water for at least 15 seconds.

Hand hygiene should occur:

- Before client/patient/resident or environment contact
- Before performing aseptic procedures

- After care involving bodily fluids
- After client/patient/resident or environment contact

Prevention and Control of MRSA

- If the patient is known to have had MRSA in the past, Contact Precautions should be initiated:
 - Hand hygiene as described in Routine Practices
 - Appropriate placement
 - Gloves for all activities in the patient's room or bed space in acute care, or for direct care of clients/residents in long term care and ambulatory/clinic setting
 - Gowns if contact with the patient or the patient's environment is anticipated
 - Hand hygiene must be performed after removing PPE
 - Dedicated equipment or adequate cleaning and disinfecting of shared equipment, including transport equipment
 - Daily cleaning of all touched surfaces in the room
- Notify the Infection Prevention and Control Practitioner or delegate to discuss the infection control management of client/patient/resident activities
- Additional surveillance specimens for colonization of client/patient/resident contact(s) may be required, as directed by Infection Prevention and Control

Family and Visitors

All families/visitors should practice good hand hygiene before and after leaving the client/patient/resident room.

Families/visitors who provide direct care are to wear the same PPE as staff. "Direct care" is defined as providing hands-on care such as bathing, washing, turning the client/patient/resident, changing clothes/incontinent pads, dressing changes, care of open wounds/lesions and toileting. Feeding and pushing a wheelchair are not classified as direct care.

Written information should be available for clients/patients/residents that explain the precautions required.

Source: Ministry of Health and Long-Term Care/Public Health Division/Provincial Infectious Diseases Advisory Committee, Toronto, Canada

APPENDIX A-2

VANCOMYCIN-RESISTANT ENTEROCOCCUS (VRE) Fact Sheet for Healthcare Professionals

What is VRE?

Enterococci are bacteria that live in the gastrointestinal tract of most individuals and generally do not cause harm (“colonization”). Vancomycin-resistant enterococci (VRE) are strains of Enterococci that are resistant to the antibiotic vancomycin. If a person has an infection caused by VRE, such as a urinary tract infection or blood infection, it may be more difficult to treat.

How is the VRE Spread?

VRE is spread from one person to another by contact, usually on the hands of caregivers. VRE can be present on the caregiver’s hands either from touching contaminated material excreted by the infected person or by touching contaminated environmental surfaces. VRE can survive on inanimate objects such as toilet seats, door handles, bedrails, furniture, stethoscopes, rectal thermometers and bedpans.

Risk Factors for VRE

People at risk for colonization or infection with VRE are usually hospitalized and have an underlying medical condition which makes them susceptible to infection. These conditions include clients/patients/residents with:

- Previous hospitalization or transfer between health care facilities (in Canada or outside Canada)
- Critical illness (es) in intensive care units
- Severe underlying disease or weekend immune systems
- Urinary catheters
- Exposure to (or contact with) a client/patient/resident with VRE
- Antibiotic use, particular vancomycin

Good Hand Hygiene Practices

Remind all staff and visitors to practice good hand hygiene before and after client/patient/resident contact/care. Health care staff should review the correct method of hand hygiene, as well as demonstrate the proper donning/removal of personal protective equipment (PPE) for clients/patients/residents, families and visitors.

Good hand hygiene practices refer to the use of alcohol-based hand rub or soap and running water for at least 15 seconds.

Hand hygiene should occur:

- Before client/patient/resident or environment contact
- Before performing aseptic procedures
- After care involving body fluids
- After client/patient/resident or environment contact

Prevention and Control of VRE

- If the client/patient/resident is known to have had VRE in the past, Contact Precautions should be initiated:
 - Hand hygiene as described in Routine Practices
 - Appropriate client/patient/resident placement
 - Gloves for all activities in the patient's room or bed space in acute care, or for direct care of clients/residents in long-term care and ambulatory/clinic settings
 - Long-sleeved gown for activities where skin or clothing will come in contact with the patient or their environment in acute care, or for direct care of client's/residents in long term care and ambulatory/clinic settings
 - Dedicated equipment or adequate cleaning and disinfecting of shared equipment, including transport equipment
 - Notify the Infection Prevention and Control Practitioner or delegate to discuss the infection control management or client/patient/resident activities
 - Additional surveillance specimens for colonization of client/patient/resident contact(s) may be required, as directed by Infection Prevention and Control

Family and Visitors

All families/visitors should practice good hand hygiene before and after leaving the client/patient/resident room.

Families/visitors who provide direct care are to wear the same PPE as staff. "Direct care" is defined as providing hands-on care such as bathing, washing, turning the client/patient/resident, changing clothes/incontinent pads, dressing changes, care of open wounds/lesions and toileting. Feeding and pushing a wheelchair are not classified as direct care.

Written information should be available for clients/patients/residents that explains the precautions required.

Source: Ministry of Health and Long-Term Care/Public Health Division/Provincial Infectious diseases Advisory Committee. Toronto, Canada

APPENDIX A-3

EXTENDED-SPECTRUM BETA-LACTAMASE (ESBL) PRODUCING BACTERIA

Fact Sheet for Healthcare Professionals

What are ESBLs?

ESBLs 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 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 cause an infection, without any signs or symptoms of infection are said to be colonized. The most common ESBL-producing bacteria are some strains of *Escherichia coli* and *Klebsiella pneumoniae*.

How are ESBLs spread?

ESBLs are spread via direct and indirect contact with colonized/infected patients and contaminated environmental surfaces. ESBLs are most commonly spread via unwashed hands of health care providers.

Risk Factors for ESBLs

Risk factors for ESBL-producing bacterial acquisition include:

- Direct transfer from another hospital, nursing home, retirement home or other health care facility, including between facilities in the same health care corporation
- Any hospital, nursing retirement home or other health care facility admission in the past year
- Patient receiving home health care services or hemodialysis
- Patient living in a communal living setting (e.g. shelter, halfway house)
- Patient who previously had an antibiotic-resistant organism (e.g., MRSA, VRE)

Good Hand Hygiene Practices

Remind all staff and visitors to practice good hand hygiene before and after client/patient/resident contact/care. Health care staff should review the correct method of hand hygiene, as well as demonstrate the proper donning/removal of personal protective equipment (PPE) to clients/patients/residents, families and visitors.

Good hand hygiene practices refer to the use of alcohol-based hand rub or soap and running water for at least 15 seconds.

Hand hygiene should occur:

- Before client/patient/resident or environment contact
- Before performing aseptic procedures
- After care involving body fluids
- After client/patient/resident or environment contact

Prevention and Control of ESBLs

- Consistent use of Routine Practices with all patients/residents/clients
- Initiate Contact Precautions for patients/residents with an ESBL infection

Management of Antibiotic Resistant Organisms

- Appropriate client/patient/resident placement
 - Gloves for all activities in the patient's room or bed space in acute care, or for direct care of clients/residents in long-term care and ambulatory/clinic settings
 - Long-sleeved gown for activities where skin or clothing will come in contact with the patient or their environment in acute care, or for direct care of clients/residents in long-term care and ambulatory/clinic settings
 - Dedicated equipment or adequate cleaning and disinfecting of shared equipment, with particular attention to management of urinary catheters and associated equipment
-
- Notify the Infection Prevention and Control Practitioner or delegate to discuss the infection control management of client/patient/resident activities
-
- Precautions are not to be discontinued until reviewed by Infection Prevention and Control

Family & Visitors

All families/visitors should practice good hand hygiene before and after washing leaving the client/patient/resident room.

Families/visitors who provide direct care are to wear the same PPE as staff. "Direct care" is defined as providing hands-on care such as bathing, washing, turning the client/patient/resident, changing clothes/incontinent pads, dressing changes, care of open wounds/lesions and toileting. Feeding and pushing a wheelchair are not classified as direct care.

Written information should be available for clients/patients/residents that explain the precautions required.

Source: Ministry of Health and Long-Term Care/Public Health Division/Provincial Infectious Diseases Advisory Committee. Toronto, Canada

APPENDIX A-4

CARBAPENEM-RESISTANT GRAM-NEGATIVE BACILLI Fact Sheet for Healthcare Professionals

What are Carbapenem-resistant Gram-negative bacilli (CRGNB)?

Recent reports from around the world indicate an increasing occurrence of antimicrobial resistance in Gram-negative bacteria. Of particular concern is the development of resistance to a group of antibiotics called carbapenems. The carbapenem group of antimicrobials has been a safe and generally effective treatment for severe Gram-negative bacterial infections when resistance to other classes of antimicrobials is present. When resistance to carbapenems occurs, there are often few alternatives treatments available. Carbapenem resistance develops as a result of the production of carbapenem-hydrolysing enzymes (carbapenemases). Some examples of recently identified carbapenemases are:

- *Klebsiella pneumoniae* carbapenemase which have caused major healthcare related outbreaks in Greece, Israel and north eastern USA
- New Delhi metallo (NDM) beta-lactamase found in *Escherichia coli* and *Klebsiella pneumoniae* which has recently been identified in India and Pakistan and in patients hospitalized in other countries after receiving health care in India and Pakistan

How are CRGNB spread?

The most common form of transmission is by direct and indirect contact with an infected person.

Risk factors for CRGNB infections

There should be a high index of suspicion for the presence of CRGNB in patients at risk for infection with these bacteria, including: patients transferred from facilities known to have high CRGNB prevalence rates, roommates of CRGNB colonized or infected patients; and patients known to have been previously infected or colonized with a CRGNB. Laboratory testing for asymptomatic carriage of CRGNB is not routinely recommended.

Good Hand Hygiene Practices

Hand hygiene is the single most important way to prevent the spread of infections. Perform hand hygiene using an alcohol based hand rub (60-90%) or use soap and water if hands are visibly soiled.

Hand hygiene should occur:

- Before client/patient/resident or environment contact
- Before performing aseptic procedures
- After care involving bodily fluids
- After client/patient/resident or environment contact

Prevention and Control of CRGNB

- Place patients with known or suspected (pending results) CRGNB infection or colonization on Contact Precautions.
 - A single room is preferred. If respiratory infection is also suspected, use Droplet and Contact Precautions
 - Place infection control signage on the door

Management of Antibiotic Resistant Organisms

- Personal Protective Equipment (PPE)
 - Gloves should be worn when entering the room
 - Gown should be worn if direct contact with the patient or with environmental surfaces or objects is anticipated
 - Perform hand hygiene after removing gown and gloves and after leaving the room
- Dedicate patient care equipment for the use of one patient
 - Clean and disinfect equipment according to Routine Practices
 - Equipment shared with between patients should be cleaned and disinfected before use on another patient
- Environmental Cleaning
 - All horizontal and frequently touched surfaces should be cleaned at least twice daily and when soiled
 - Hospital-grade cleaning and disinfecting agents are sufficient for environmental cleaning
- Dishes/Laundry/Waste Management
 - No special precautions are recommended; Routine Practices should be followed
- Discontinuing Precautions
 - Consult Infection Prevention and Control. Contact Precautions should continue for the duration of the hospitalization during which the CRGNB was first isolated
 - Patients readmitted within 12 months of that hospitalization should be considered probably colonized with CRGNB and placed on Contact Precautions

Family & Visitors

All families/visitors should practice good hand hygiene before and after washing leaving the client/patient/resident room.

Families/visitors who provide direct care are to wear the same PPE as staff. “Direct care” is defined as providing hands-on care such as bathing, washing, turning the client/patient/resident, changing clothes/incontinent pads, dressing changes, care of open wounds/lesions and toileting. Feeding and pushing a wheelchair are not classified as direct care.

Written information should be available for clients/patients/residents that explains the precautions required.

Source: Public Health Agency of Canada

APPENDIX B-1

METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* Acute Care – Information for Patients and Visitors

What is METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA)?

Staphylococcus aureus is a germ that normally lives in the nose, rectum and on human skin. MRSA is a type of *Staphylococcus aureus* that is not killed by the usual antibiotics.

How is MRSA spread?

Anyone can get MRSA. You can get it by touching someone or something that has the germs on it and then touching your skin or your nose.

Are certain people at risk of getting MRSA?

People most likely to get MRSA are those who:

- Are seriously ill
- Are hospitalized for a long time
- Have taken many antibiotics

Does everybody that comes in contact with MRSA become sick?

No, sometimes the germ lives on the body without causing infection and does not require treatment. This is called colonization. If you have an infection with MRSA you may need specific antibiotics.

MRSA..What does this mean for me in the hospital?

Contact Precautions are necessary to prevent the spread of MRSA in the hospital.

How can we stop the spread?

Contact Precautions will be taken while you are in hospital. Handwashing is the best way to prevent the spread of this germ. All staff, family members and visitors should wash their hands before entering and when leaving your room. A waterless hand sanitizer is available for use.

- A sign will be posted
- Staff will wear gown/gloves when providing direct care
- You will need to stay in your room/bed space
- Only leave your room as directed by the nursing staff
- You should always wash your hands if you have to leave your room
- MRSA can live on objects in the room so it is important to clean and disinfect items before they are taken out of the room
- In some cases items required for your daily care will remain in the room. Such items may include a wheelchair, walker, blood pressure cuff, chair and/or food.
- Housekeeping will clean your room on a daily basis as per their policy

Can my family and friends come to visit?

Yes. Things they should do:

- Check with the nurse before entering your room
- Limit visitors to two at a time
- Wash their hands when they enter and when they leave your room
- Follow the directions on the Contact Precautions sign
- Check with staff before bringing any items, including food, into or out of your room

Management of Antibiotic Resistant Organisms

- Ask staff for items from the kitchen and utility room
- Wear gown and gloves if they are helping with your direct care
- Always remove gowns and gloves before leaving your room
- Avoid visiting other patients
- Children under 12 should not visit unless there is a special reason

What will happen when I leave the hospital?

Although the spread of MRSA at home is a very low risk and not likely to occur, the following measures should be taken:

- Handwashing prevents the spread of infection. You and your family should wash your hands regularly with soap and water
- You can return to your normal routine
- Laundry and dishes can be done as usual
- No special cleaning is required
- In most instances no special precautions are required for visitors to your home

If you have a MRSA Infection

- Take antibiotics until they are all gone
- Never give someone antibiotics that have been prescribed for you
- Anyone doing close personal care for you, involving contact with wounds, urine, etc., should wash their hands before and after providing the care
- Do not share personal items such as face clothes, towels, razors, toothbrushes until your infection has been treated

ALWAYS REMEMBER....

- As some people may remain carriers of this germ, we should take precautions during any further visits to health care facilities
- Your history of MRSA will be noted in your health record
- If you go to another doctor or hospital please tell them you were on Contact Precautions for MRSA

Source: Provincial Infection Control –NL Group October 13, 2010

APPENDIX B -2

METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* Long Term Care - Information for Residents and Visitors

What is METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA)?

Staphylococcus aureus is a germ that normally lives in the nose, rectum and on human skin. MRSA is a type of *Staphylococcus aureus* that is not killed by the usual antibiotics.

How is MRSA spread?

Anyone can get MRSA. You can get it by touching someone or something that has the germs on it and then touching your skin or your nose.

Are certain people at risk of getting MRSA?

People most likely to get MRSA are those who:

- Are seriously ill
- Are hospitalized for a long time
- Have taken many antibiotics

Does everybody that comes in contact with MRSA become sick?

No, sometimes the germ lives on the body without causing infection and does not require treatment. This is called colonization. If you have an infection with MRSA you may need specific antibiotics.

MRSA...What does this mean for me in long term care?

If you do not have an infection no special precautions are needed for your care.

- Handwashing is the best way to prevent the spread of this germ
- All staff, family members and visitors should wash their hands before entering and when leaving your room
- A waterless hand sanitizer is available for use

If you have an active MRSA infection (such as an open weeping wound)...

- A sign will be placed to remind others about the precautions
- Staff will wear gown/gloves when providing direct care
- Family members who provide direct personal care require a gown and gloves
- You should always wash your hands if you have to leave your room
- All items in your room will be cleaned on a daily basis

What happens if I have to go to hospital?

- If you go to the hospital you will be placed in a private room on Contact Precautions
- The precautions are needed to prevent the spread of MRSA to other patients
- The nursing staff at the hospital will inform you and your family about these precautions

Will the MRSA go away?

- MRSA may go away on its own, but sometimes it does not
- You may be colonized but not have an active infection
- Your activities will not be restricted if you have MRSA colonization
- You will be permitted to take part in all activities and social events
- You should wash your hands frequently to stay healthy

Source: Provincial Infection Control -NL Group October 13, 2010

APPENDIX B-3

COMMUNITY-ASSOCIATED METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA) **Information for Patients and Families**

What is METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA)?

Staphylococcus aureus is a germ that normally lives in the nose and on human skin. MRSA is a type of *Staphylococcus aureus* that is not killed by the usual antibiotics. It can cause common skin infections such as boils, abscesses and infected scratches.

How is MRSA spread?

Anyone can get an infection due to MRSA, which can be spread by touching someone or something that has the germ on it and then touching your skin or your nose.

Are certain people at risk of getting community-MRSA?

Yes, over the past few years certain people have been found to have an increased risk of getting an infection due to MRSA including:

- People who have taken antibiotics frequently;
- Children, as they are less likely to wash their hands;
- Those involved in contact sports;
- Intravenous drug users sharing needles; and,
- People living in crowded conditions.

Does everybody that comes in contact with MRSA become sick?

No, sometimes the germ lives on the body without causing infection and does not require treatment. This is called colonization. If you have an infection with MRSA, you may not need an antibiotic. Your doctor or nurse will advise you on the best treatment for your infection.

How can we stop the spread?

Basic hygiene is the best prevention...

- Frequent hand washing is the best way to prevent the spread of all germs especially:
 - After touching the nose or mouth, and areas on the skin such as cuts, boils or pimples
 - After touching body fluids such as urine, or things soiled with body fluids such as dirty tissues
 - After blowing your nose, coughing, sneezing or using the bathroom;
 - Before preparing food, eating or drinking
 - When hands look dirty
- When house cleaning:
 - Pay special attention to areas that are touched often such as door handles, telephones, etc.
 - Use regular household cleaner
 - Clean once a week and more frequently if someone is sick with an infection
- When sending children to daycare centers and/or schools, remind them to:
 - Clean their hands before leaving and when returning home

Management of Antibiotic Resistant Organisms

- Not share personal things like towels and clothing.
- If participating in sports or athletic activities:
 - Clothing and sporting equipment (e.g. mats) should be washed or wiped down after each use
 - Do not share personal items like water bottles, towels, clothing, uniforms, razors, etc.
 - Take a shower after each practice or game to prevent infection
- Remember the three Cs: CLEAN, COVER & CONTAIN
 - Clean hands frequently
 - Cover mouth and nose when coughing or sneezing
 - Contain any illness by staying away from others

How do I prevent the spread if I have an infection with MRSA?

Making sure family members do not come in contact with sores or fluid from the sores is the best way to prevent the spread of an infection with MRSA.

- If an individual has an infected skin lesion, the person should:
 - Clean his or her hands with soap and water after touching the lesion;
 - Cover the lesion with a dressing to contain the drainage and wash hands afterwards;
 - Seek medical care if required;
 - If the dressing becomes wet with drainage it should be changed;
 - The area used for changing the dressing should be cleaned with a household cleaner;
 - Place the soiled dressing in a small bag and put it in the garbage;
 - Do not share soaps, creams, lotions, makeup, and other personal products;
 - Do not share personal items that come in contact with the skin such as razors, toothbrushes, towels, and nail files;
 - Use a regular household cleaner when cleaning;
 - Clothes and linens can be washed in the regular household laundry as routine laundry washing and drying destroys this germ;
 - Dishes and cutlery can be washed in the usual manner with other household utensils using soap and water or the dishwasher;
 - It is OK to have visitors and friends visit at home;
 - If working, going to school or attending a daycare, ensure that the lesion is covered and hand are cleaned frequently.

Always remember: When going to the hospital or clinic, tell the doctor or nurse about any previous infection with MRSA in the past.

Source: Provincial Infection Control –NL Group December 21, 2010

APPENDIX B-4

VANCOMYCIN-RESISTANT ENTEROCOCCI (VRE) Information for Patients and Visitors

What is VRE?

Enterococci are bacteria (germs) that live in the bowel of all people and very rarely cause infections. However, some patients in hospital have medical problems that make it harder for them to fight infections. Therefore, they have a greater chance of getting an infection with these bacteria.

Vancomycin is an antibiotic that is used to treat serious infections with bacteria that are resistant to more common antibiotics like penicillin. In hospital we rely on Vancomycin to treat many kinds of infections that cannot be treated with other kinds of antibiotics. Until recently we were confident that Vancomycin would always be an effective treatment.

Vancomycin-Resistant Enterococci (VRE) are the first common bacteria to be resistant to Vancomycin and their presence in the hospital increases the possibility of infection occurring for which there are very few effective antibiotics.

How does a bacterium become resistant?

One thing is clear – the more antibiotics are used, the more antibiotic resistant bacteria there will be. In North America antibiotics have been prescribed very readily and public demand is high. They are used in large quantities in farm animals to promote growth and increase profits. Many bacteria that infect humans are becoming resistant to a variety of antibiotics. We all need to be part of an effort to reduce unnecessary antibiotic use – the root of the problem.

How is VRE spread?

VRE is spread by direct contact with a person who has VRE. Because it is a bowel organism, it commonly contaminates the environment of patients, especially those with diarrhea or difficulty in controlling their bowels. Hands of patients and caregivers become contaminated and are the main means by which the bacteria are spread.

Are certain people at risk of getting VRE?

People who have been previously treated with many antibiotics especially vancomycin are at risk of developing VRE.

Do all people with VRE get sick?

No. Most people who acquire it only carry it in their bowel and never become sick.

Why all the concern?

Enterococci are readily transmitted from person to person by direct contact and VRE can rapidly become a common bacteria in hospital. If this happens patients entering hospital will have a high likelihood of contacting VRE and carrying it in their bowel. If they are one of the few who gets a serious infection with enterococci, there could be limited treatment options. By isolating people known to have VRE in their bowels, we can limit the spread and, hopefully, stop VRE from becoming a common hospital bacterium.

What infections do enterococci cause?

Enterococci most commonly cause urinary tract infections.

How can we stop the spread?

Isolation of patients known to have VRE and strict attention to hygiene has been shown to reduce the spread. Specific measures include:

- Private rooms or sharing of rooms among patients with VRE
- Frequent handwashing by patients
- Handwashing by all persons before entering the room
- Gloves and gowns for all people who provide direct patient care
- Removal of gowns and gloves within the room and handwashing before leaving
- Equipment, e.g. blood pressure cuffs, should not be shared among patients
- Frequent and thorough cleaning of the environment

What will happen when I leave the hospital?

VRE is not a problem outside of hospital and poses no risk for friends and family. If a patient is transferred to another health care facility, the receiving institution will be informed.

Does VRE ever go away?

Yes, but it is difficult to predict when it will occur. Some people will carry it for many years.

ALWAYS REMEMBER....

- As some people may remain carriers of this germ, we should take precautions during any further visits to health care facilities
- Your history of VRE will be noted in your health record
- If you go to another doctor or hospital please tell them you were on Contact Precautions for VRE

APPENDIX B-5

EXTENDED-SPECTRUM BETA-LACTAMASE PRODUCING BACTERIA Information for Patients and Visitors

What are extended-spectrum beta-lactamase (ESBL) producing bacteria?

- ESBLs are enzymes produced by bacteria, such as Klebsiella and Escherichia coli
- These enzymes make certain antibiotics ineffective
- The extended-spectrum (third generation) antibiotics affected can be Cefotaxime, Ceftazidime or Ceftriaxone.
- ESBL producing bacteria are often resistant to other drug classes

How are ESBLs Spread?

They can be passed directly from person to person on contaminated hands or indirectly on contaminated equipment used between patients.

Are certain people at risk of getting ESBLs?

- People most likely to get ESBLs are those who:
- Are seriously ill
- Are hospitalized for a long time
- Have taken many antibiotics

What infections are commonly associated with ESBLs?

- Urinary tract infections
- Pneumonia
- Wound infections

Can we prevent the spread of ESBLs in hospitals?

- Prevention measures include:
- Use of Routine Practices
- Contact Precautions during the treatment of an ESBL infection
- Wise use of antibiotics
- Cleaning all environmental surfaces daily with a hospital disinfectant

Are there treatment options?

Yes, infections can be treated but there are fewer antibiotic choices.

What will happen when I leave the hospital?

- You do not need to take special precautions at home, other than practicing good hand hygiene
- ESBLs tend to be less of a problem outside the hospital
- Family members should also be educated about the importance of hand hygiene

APPENDIX B-6

CARBAPENEM-RESISTANT GRAM-NEGATIVE BACILLI Acute Care -Information for Patients and Visitors

What are carbapenem resistant Gram-negative bacilli?

Gram-negative bacilli are one of the major types of bacteria that are present in and around our bodies. Many of these bacteria cause us no harm however some Gram-negative bacteria can cause infections. Gram-negative bacilli have been developing resistance to antibiotics and one of the most recently identified resistance is to a class of antibiotics called carbapenems. This makes treating an infection difficult because of the limited choice of antibiotics available. This “carbapenem resistance” appears to be a growing problem worldwide. It is currently rare in Canada. Canadian hospitals have developed programs to identify and screen patients who might be at risk of developing an infection with this bacterium.

How is it spread?

The most common way of passing this germ from one person to another is by contact; both direct and indirect. This means that the bacteria can be spread from one person to another on their hands or by touching surfaces that have been contaminated with the bacteria. Patients who have been in a hospital outside Canada or in contact with a patient who has a carbapenem resistant Gram-negative bacteria are most at risk.

How do we prevent spreading the germ between people?

The most effective way to prevent transmission is by doing careful hand hygiene (hand washing or using alcohol based hand rub) before eating or preparing food, after using the toilet or other personal hygiene activities, before leaving your room for common/public areas and when returning to your room from public areas. Health care professionals will wear protective clothes to reduce the chance of spreading these bacteria between patients or the environment. Do not hesitate to remind healthcare workers about their hand hygiene before they provide care.

What are the risks for patients?

For healthy people these bacteria generally do not pose a threat. For those people who are ill; these bacteria may cause an infection.

What will happen when I leave the hospital?

Do not forget that bacteria are always present in and around our bodies. The most important way to prevent the spread of infection is careful attention to hand hygiene and personal hygienic practices. Bathe regularly with soap and water. Keep your bathroom environment clean; common household detergents are acceptable cleaning agents.

Source: Provincial Infection Control Network BC

APPENDIX C

RISK ASSESSMENT

Infected or Colonized Source Patient

(Adapted from Health Canada, Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care, 1999)

	Higher Risk of Transmission	Lower Risk of Transmission
PATIENT	<ul style="list-style-type: none"> • Draining skin lesions or wounds not covered by dressings • Respiratory secretions (uncontrolled) • Patient requiring extensive hands-on care • Patient has invasive devices • Poor compliance with hygienic practices and infection control precautions, e.g., confused patient • Incontinence of stool or urine (not contained) • Exfoliating skin conditions 	<ul style="list-style-type: none"> • Skin lesions or wounds covered by dressing • Able to control respiratory secretions • Capable of self care • Good hygiene • Able to comply with infection control precautions • Continent
MICROORGANISMS	<p>characteristics that promote transmission:</p> <ul style="list-style-type: none"> • Spread by contact • Able to survive in the environment • Able to colonize invasive devices • Propensity for asymptomatic/carrier state 	
ENVIRONMENT	<ul style="list-style-type: none"> • Inadequate housekeeping • Shared patient care equipment without cleaning between patients (e.g., thermometer bases, commodes) • Crowded facilities • Shared facilities (e.g., rooms, toilets, bath, sinks) • High patient-nurse ratio 	<ul style="list-style-type: none"> • Appropriate housekeeping • Dedicated equipment • Adequate spacing between beds • Dedicated bathroom facilities • Low patient-nurse ratio
HOST PATIENT	<ul style="list-style-type: none"> • Requiring extensive hands-on care. • Have invasive procedures or devices • Non-intact skin • Exfoliating skin conditions • Debilitated, severe underlying disease • Extremes of age • Recent antibiotic therapy • Immunosuppression 	<ul style="list-style-type: none"> • Able to do self-care • No indwelling devices • Intact skin and mucous membranes

APPENDIX D-1

PATIENT NOTIFICATION FORM

Patient's Name: _____

MCP # _____

The Infection Control Practitioner/designate has:

- reviewed the Fact Sheet on
- discussed identification of the patient's ARO status through the computer electronic system
- reviewed the need for precautions for this ARO on readmission

The patient has verbally agreed with the flagging of the chart.

Infection Control Practitioner's Signature

Date

APPENDIX D-2

PATIENT NOTIFICATION FORM

Antibiotic-resistant organisms (AROs)

Dear Dr.

RE Patient: _____

MCP#: _____

ARO type: _____

This patient has been identified as being colonized/infected with an ARO by the Microbiology Lab at the _____.

It is the policy of the Regional Health Authority (RHA) to inform the patient of the ARO status and make them aware of the following:

- The RHA maintains a electronic database of all ARO positive patients
- On admission to hospital Contact Precautions will be required for those colonized or infected with an ARO

The Infection Control Service is seeking your assistance in notifying this patient.

Thank you for your assistance. If you require further information please call me at _____.

Sincerely,

Infection Control Practitioner

Attachment: Microbiology report

APPENDIX E

CULTURING TECHNIQUE

MRSA

To determine the colonization status of a patient the following screening is necessary.

1. The following routine screening is required:
Anterior nares
 - Use a sterile swab moistened with sterile saline or culture tube transport medium
 - The swab should be placed gently in one nostril and use a circular motion to touch as much mucous membrane as possible
 - The same swab can be used for both nares
2. If the patient has an open wound, an area of dermatitis, a tracheostomy or an indwelling urinary catheter appropriate specimen should be sent for culture:
Open wound – swab for MRSA screen
Urinary catheter – urine for MRSA screen
Tracheostomy – sputum for MRSA screen
3. The culture swab is then placed in the transport medium and labeled appropriately.
The request on the requisition should identify the specimen for “MRSA Screen” only.

VRE

To determine the colonization status of a patient:

1. A rectal swab or a stool culture is required
 - Stool specimen is preferred for VRE, as the yield is higher
 - If a stool specimen is obtained it should be placed in a sterile container
 - If a swab is taken, pre moisten in culture tube transport medium
2. If the patient has an indwelling urinary catheter, a urine specimen should be sent.
3. The request on the requisition should identify the specimen for “VRE Screen” only.

ESBLs – no screening recommended.

Carbapenem resistant Gram-negative bacteria – no screening recommended.

Note: Specimens may show a false negative result if the patient is on an antibiotic to which the microorganism is sensitive. MRSA may not show up on specimens taken from patients who have recently had an antimicrobial bath. Surveillance specimens should be taken once the antibiotic has been discontinued for 48 hours.

APPENDIX F

SCRIPT FOR SCREENING PATIENTS

A bacterium which is resistant to many common antibiotics has been identified on this Unit. Sometimes this germ spreads to other patients. To see if this bacterium has spread we are doing cultures of some patients on this Unit. If you have this bacterium and get an infection you may require different antibiotics. The cultures will be taken from your nose, and possibly other areas. The report will be available from the laboratory in approximately three days. You will be notified if the results are positive.