

**Best Practice Guidelines for Reducing  
Transmission of Antibiotic Resistant Organisms (AROs)  
In Acute & Long Term Care Settings, Home Care & Prehospital Care  
March 2012 | For Healthcare Professionals**

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Infection Prevention and Control Nova Scotia (IPCNS), Department of Health and Wellness  
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## Abbreviations

| Abbreviations | Descriptive Name                                                                                                   |
|---------------|--------------------------------------------------------------------------------------------------------------------|
| ABHR          | Alcohol-based hand rub                                                                                             |
| ARO           | Antimicrobial Resistant organism/microorganism                                                                     |
| CA-MRSA       | Community-associated methicillin-resistant <i>Staphylococcus aureus</i>                                            |
| CHICA – NS    | Community and Hospital Infection Control Association – Nova Scotia                                                 |
| CNISP         | Canadian Nosocomial Infection Surveillance Program                                                                 |
| C&S Swabs     | Culture and Sensitivity Swabs                                                                                      |
| EHS           | Emergency Health Services                                                                                          |
| EMC           | Emergency Medical Care                                                                                             |
| ESBL          | Extended Spectrum Beta Lactamase                                                                                   |
| HAI           | Healthcare-associated Infection HA-MRSA Healthcare – associated methicillin-resistant <i>Staphylococcus aureus</i> |
| HIV           | Human Immunodeficiency Virus                                                                                       |
| ICP           | Infection Control Professional                                                                                     |
| ICU           | Intensive Care Unit                                                                                                |
| IDAC          | Infectious Disease Advisory Committee, Province of Nova Scotia                                                     |
| MIC           | Minimal Inhibitory Concentration                                                                                   |
| MRSA          | Methicillin-resistant <i>Staphylococcus aureus</i>                                                                 |
| MSSA          | Methicillin-susceptible <i>Staphylococcus aureus</i>                                                               |
| PHAC          | Public Health Agency of Canada                                                                                     |
| PIDAC         | Provincial Infectious Diseases Advisory Committee (Province of Ontario)                                            |
| PPE           | Personal Protective Equipment                                                                                      |
| PCR           | Polymerase Chain Reaction                                                                                          |
| VRE           | Vancomycin-resistant enterococcus                                                                                  |
| VSE           | Vancomycin-susceptible enterococci                                                                                 |

## Introduction

This document has been developed to provide guidance for reducing the risk of transmitting AROs in all settings where healthcare is delivered. The guidance in this document is based on best practices and applies to Acute Care, Long Term Care (nursing homes, homes for the aged, and residential care facilities), Home Care, and Prehospital Care (Emergency Health Services (EHS) contracted by Emergency Medical Care) settings in Nova Scotia (NS).

A literature search was conducted and reviewed in preparation for this document. IPCNS would like to acknowledge the well researched guidance documents developed by The Provincial Infectious Diseases Advisory Committee Ontario (PIDAC)<sup>1</sup> and Provincial Infection Control Network (PICNET) BC<sup>2</sup> for the management of Antibiotic Resistant Organisms, which were used and adapted for Nova Scotia.

The guidelines were developed in collaboration with a working group of professionals from acute care, long term care, home and community care, prehospital care and public health.

These guidelines are intended to provide a framework and source of information for those responsible for developing guidelines and policies in Acute Care, Long Term Care, Home Care, and Prehospital Care for the management of individuals colonized or infected with MRSA, VRE or an ESBL. They may be modified to accommodate the specific needs of the patient/resident/client population and services provided in NS healthcare facilities. The guidelines are not regulatory. However, we recommend they be used to standardize infection prevention and control practices throughout NS. Because patients/clients/residents often utilize more than one facility and cross District Health Authority boundaries, a consistent approach will reduce confusion and promote a better understanding by all of the required practices. A consistent approach to the control of AROs across NS is attainable if each healthcare sector develops its own ARO infection control policies and procedures based on these guidelines.

This document represents the **minimum** that should be implemented within a healthcare setting or during the transport of clients/patients/residents within and between facilities, recognizing that bed utilization, facility resources, and other variables may make implementation of these guidelines challenging. Facilities or districts may opt to enhance their screening or isolation practices based on local epidemiological trends, outbreaks, and available resources.

## Assumptions for Infection Prevention and Control

Best practices in this document are based on the assumption that NS healthcare settings already have basic infection prevention and control measures in place. If this is not the case, healthcare settings will find it challenging to implement the practices recommended for reducing the risk of ARO transmission. If healthcare settings do not have dedicated infection control resources, they are encouraged to seek assistance from resources such as IPCNS and/or CHICA NS.

In addition to the assumption of basic infection prevention and control, these best practice guidelines are also based on the following assumptions and principles:

1. Healthcare settings routinely implement best practices to prevent and control the spread of infectious agents, including the Public Health Agency of Canada's "Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare."<sup>3</sup>
2. Healthcare settings devote adequate resources to infection prevention and control.
3. Healthcare settings have programs in place that promote good hand hygiene practices and ensure adherence to guidelines for hand hygiene.
4. Healthcare settings devote adequate resources to environmental services/housekeeping that include written procedures for cleaning and disinfection of client/patient/resident rooms and equipment, education of new cleaning staff and continuing education of all cleaning staff, ongoing review of procedures, and regular housekeeping performance audits.
5. ICP or designate provides regular education (including orientation and continuing education) and support to help staff consistently implement appropriate infection prevention and control practices. Education programs shall be flexible enough to meet the diverse needs of the range of healthcare providers and other staff who work in the healthcare setting. Effective education programs emphasize:
  - The risks associated with infectious diseases and the benefits of case finding/surveillance.
  - The importance of proper and prudent use of antibiotics.
  - Hand hygiene including the use of alcohol-based hand sanitizers and hand washing.
  - Principles and components of Routine Practices as well as additional transmission-based precautions.
  - Assessment of the risk of infection transmission and the appropriate use of personal protective equipment (PPE), including safe application, removal, and disposal.
  - Appropriate cleaning and/or disinfection of healthcare equipment, supplies, surfaces, or items in the healthcare environment (e.g. beds, bed tables, call bells, toilets, privacy curtains).
  - Individual staff responsibility for keeping clients/patients/residents, themselves, and co-workers safe.
6. Healthcare settings promote collaboration between professionals involved in occupational health nursing, occupational health and safety, and infection prevention and control in implementing and maintaining appropriate infection prevention and control standards that protect workers.
7. The healthcare setting is to be in compliance with the legislative and regulatory context within which it functions, and is responsible for the following:
  - a) Health services delivery, under the direction of the District Health Authorities (under Boards appointed by the Minister of Health), Health Authorities Act, S.N.S. 2000, c.6.

- b) Provincial standards and health policy development under the direction of the Minister of Health, Health Authorities Act, S.N.S. 2000, c.6.
  - c) Preventing, assessing and mitigating 'health hazards.'
  - d) Developing plans for ongoing surveillance of communicable diseases.
  - e) Investigating the cause of any communicable disease or health hazard.
  - f) Developing appropriate communication plans, under the direction of the Medical Officers of Health accountable to the Minister of Health Promotion and Protection, Health Protection Act, S.N.S. 2004, c.4.
  - g) Waste management and the regulation of public drinking water supplies under the direction of the Minister of Environment and Labour, Environment Act, S.N.S. 1994-95, c.1. Water and Wastewater Facilities and Public Drinking Water Supplies Regulations.
8. Healthcare settings have effective working relationships with their local Public Health Services. They maintain clear lines of communication, contact Public Health Services for information and advice as required, and fulfill their obligations to report notifiable diseases and conditions as "It's the Law." Available from: [http://www.gov.ns.ca/hpp/publications/06026\\_itsthelawposter\\_en.pdf](http://www.gov.ns.ca/hpp/publications/06026_itsthelawposter_en.pdf)
9. Healthcare settings have access to ongoing infection prevention and control expertise to offer advice, guidance to support staff, and resolve any uncertainty about the level of precautions required in a given situation. Infection prevention and control expertise includes IPCNS, CHICA-NS, and the District Health Authorities and IWK Infection Control Practitioners (ICPs)
9. Healthcare settings have established procedures for receiving and responding appropriately to all international, regional, and local health advisories. They also communicate health advisories promptly to all staff responsible for case finding/surveillance and provide regular updates. Current advisories are available from local Public Health Services, Office of the Chief Medical Officer of Health, Health Canada, and Public Health Agency of Canada websites, and the Provincial Infection Control Consultant.
10. Healthcare settings report back to staff on the impact of their surveillance efforts (e.g. benefits of case finding/surveillance, preventive practices in the workplace in terms of client/patient/resident safety, client/patient/resident and staff illness, and outbreaks).
12. Healthcare settings have a process for evaluating Personal Protective Equipment (PPE) to ensure it meets quality standards where applicable.
13. Healthcare settings regularly assess the effectiveness of their infection prevention and control education programs and their impact on practices, and use that information to refine their programs.
14. Healthcare settings have an established relationship between infection prevention and control and the microbiology laboratory to support the infection prevention and control program. This includes appropriate utilization of laboratory facilities, the ability to process screening specimens in a timely fashion, and laboratory support during outbreaks.

Adherence to Routine Practices, which includes hand hygiene, cannot be overemphasized. Though measures such as MRSA, VRE, and other ARO screening, identify many clients/patients/residents carrying these microorganisms, **no control program will reliably identify all colonized or infected clients/patients/residents.** Only the consistent use of Routine Practices, particularly hand hygiene, before and after contact with every client/patient/resident or their environment, will prevent the spread of all microorganisms from unidentified cases or carriers.

## I. Background

### 1. What is *Staphylococcus aureus*?

*Staphylococcus aureus* is an aerobic Gram-positive coccoid bacterium (coccus) that lives, permanently or transiently, on the skin and mucous membranes of a large proportion of healthy adults (up to 40% ) without causing illness. These individuals who carry *S. aureus* are said to be “colonized” with the microorganism. Ten to twenty per cent of people are persistently colonized with *S. aureus*. *S. aureus* is a common cause of bacterial infections, most commonly impetigo, cellulitis, carbuncles, and abscesses; and, less often, more invasive disease such as osteomyelitis, pneumonia, and endocarditis. *S. aureus* is the single most common cause of hospital-associated infection.

### 2. What is MRSA?

When *S. aureus* develops resistance to the beta lactam class of antibiotics (e.g. cloxacillin), it is known as methicillin-resistant *S. aureus* (MRSA).

Although the evidence is contradictory, it is thought that MRSA infections have a higher case fatality rate than infections with methicillin-susceptible *S. aureus* (MSSA). Most experts believe this is because there is a delay in the initiation of effective antimicrobials for MRSA infections, as compared to infections due to MSSA. MRSA may be either healthcare-associated (HA-MRSA) or community-associated (CA-MRSA).

### 3. MRSA Epidemiology

MRSA was historically almost entirely associated with healthcare settings. However, community-associated MRSA (CA-MRSA) strains have emerged in recent years. Molecular typing has identified several different strains of MRSA in Canada, coded CMRSA-1 to CMRSA-10. To date, CA-MRSA strains have been genetically and clinically distinct from HA-MRSA strains and have different resistance profiles. This phenomenon may change as CA-MRSA and HA-MRSA strains mix in community and healthcare settings. In Canada, most CA-MRSA is strain CMRSA-10 and most HA-MRSA is CMRSA-2.

#### 4. Community-Associated MRSA (CA-MRSA)

CA-MRSA can be defined based on epidemiology (i.e. the person with MRSA has had no contact with a healthcare setting), as well as on molecular typing (i.e. special laboratory techniques are applied to see if the MRSA has the molecular characteristics typical of CA-MRSA strains).

CA-MRSA causes the same types of infections as MSSA. A characteristic clinical presentation of CA-MRSA is recurrent skin abscesses, often clustered among household members. Infrequently, CA-MRSA causes severe and aggressive invasive infections (necrosis and leucopenia) in healthy people due to toxin production and other virulence factors.

#### 5. Healthcare-Associated MRSA

MRSA has become endemic in many healthcare facilities in the United States. The prevalence of HA-MRSA in Canadian hospitals is generally lower, but still an issue in many areas throughout the country. Patient risk factors for the acquisition of healthcare-associated MRSA include:

- older age
- admission to an intensive care unit (ICU)
- extended stay in an acute care facility
- previous or recurrent hospitalizations
- invasive procedures
- the presence of invasive indwelling devices (intravascular lines, urinary catheter, endotracheal or tracheostomy tube, gastrostomy feeding tube)
- recurrent antibiotic use
- the presence of a surgical wound, decubitus ulcer, or other chronic wound
- contact with or proximity to a patient colonized or infected with MRSA who had draining skin lesions or wounds not covered by dressings or copious uncontrolled respiratory secretions
- malnutrition, immunosuppression (age, medication or condition-related)
- debilitated and/or bed bound and requiring extensive hands on care.

The following factors are thought to contribute to emergence of resistance in acute care settings:

- intensive, prolonged use of broad spectrum antibiotics
- high intensity of medical care provided in the close physical confines of a hospital<sup>2</sup>.

#### 6. Resistance Patterns

Healthcare-associated MRSA is typically resistant to multiple classes of antimicrobials due to the presence of multiple genes that encode resistance to a number of different antimicrobials.

In Canada, the Canadian Nosocomial Infection Surveillance Program (CNISP) has monitored the prevalence of HA-MRSA since 1995. CNISP reports an

increase in HA-MRSA colonization and infection rates from 0.95 per 100 *S. aureus* isolates in 1995 to 10.39 per 100 *S. aureus* isolates in 2003. This increase was observed nationwide; however, MRSA rates for the Atlantic provinces are less than rates for Central Canada. Rates in the Atlantic Provinces remain low, but appear to have increased significantly in the past year. Although much of the observed increase in MRSA detection may be attributed to screening programs in hospitals, there has also been a five-fold increase in MRSA infection rates. MRSA infections are associated with increased morbidity and mortality, prolonged hospitalization, and increased costs.<sup>4</sup>

## 7. How is MRSA Acquired and Spread?

Risk factors for MRSA acquisition were listed in Section 5 and include invasive procedures, prior treatment with antibiotics, prolonged hospital stay, stay in an intensive care or burn unit, surgical wound infection, and close proximity to a colonized client/patient/resident.

MRSA is most commonly spread via the transiently colonized hands of healthcare workers who acquire it through contact with colonized or infected clients/patients/residents, or after handling contaminated material or equipment. Hand hygiene and environmental surface cleaning are, therefore, important measures to prevent transmission.

Most items in the healthcare environment, especially those frequently touched by the hands of healthcare workers or clients/patients/residents have been shown to become contaminated with MRSA:

- Contamination of environmental surfaces such as medical equipment, hospital furnishings, hydrotherapy tubs, linens, tourniquets, computer keyboards, faucets, and nebulizers has been described. In some cases, these may serve as a means of transmission in certain settings.
- The environment may be a factor for fomite transmission in any setting, particularly in special settings such as burn units or intensive care units (ICU). There is evidence that some individuals may act as “super-shedders” of MRSA when co-infected with a respiratory virus and that they can spread MRSA via respiratory droplets (the “cloud” phenomenon). Therefore, in these particular circumstances, droplet transmission of MRSA may occur.

The number of colonized clients/patients/residents in a facility or unit (“colonization pressure”) will also influence the likelihood of acquiring MRSA.

## 8. What are enterococci?

Enterococci are facultative anaerobic Gram-positive coccoid bacteria that live in the gastrointestinal tract of most individuals and can also be present in the anterior urethra, vagina, skin, oropharynx, and/or bile. Enterococci may also colonize wounds, ulcers, and medical device sites in hospitalized

clients/patients/residents, and are a common cause of healthcare-associated infection.<sup>1</sup>

## 9. What is VRE?

Vancomycin-resistant enterococci (VRE) are strains of *Enterococcus faecium* and *Enterococcus faecalis* that have become resistant to vancomycin. The majority of individuals who have VRE are colonized with it. There is no evidence that infection with VRE is associated with greater mortality than infection with vancomycin-susceptible enterococci (VSE).

## 10. How is VRE Acquired and Spread?

Risk factors for VRE acquisition include severity of underlying illness, presence of invasive devices, prior colonization with VRE, antibiotic use, and length of hospital stay.

VRE is most commonly spread via the transiently colonized hands of healthcare workers who acquire it from contact with colonized or infected clients/patients/residents, or after handling contaminated material or equipment. Hospitalized clients/patients/residents with gastrointestinal carriage of VRE are the major reservoirs.

VRE transmission via environmental sources includes:

- Most items in the healthcare environment including blood pressure cuffs, electronic thermometers, monitoring devices, stethoscopes, call bells, and bed rails.
- Contamination of the environment with VRE is more likely when a client/patient/resident has diarrhea.

The number of colonized clients/patients/residents (“colonization pressure”) will also influence the likelihood of acquiring VRE.<sup>1</sup>

## 11. Extended Spectrum Beta Lactamase (ESBL)

An ESBL is a bacterial enzyme with the ability to break down many beta lactam antibiotics belonging to the penicillin and cephalosporin classes, but not carbapenems. Anytime that multidrug resistance exists, there is a risk of treatment failure should infection develop. ESBLs may be produced by any Gram negative bacteria, but are most commonly produced by *Escherichia coli* and *Klebsiella pneumoniae*. *E. coli* and *K. pneumoniae* are normal gut flora, and can live in moist wounds and urine. Healthcare-associated outbreaks of infection due to ESBLs have occurred. These bacteria spread from one patient to another via healthcare workers’ contaminated hands that touch, either infected patients or a contaminated environment and then touch another patient or surface.

ESBL-producing bacteria are more often found in elderly residents/clients of long term care facilities who have decubiti ulcers or a history of recurrent urinary tract infections or bacteriuria. The prevalence of infections caused by ESBL-

producing bacteria is increasing worldwide. Preventing further transmission requires close adherence to hand hygiene, routine practices and additional precautions as appropriate.<sup>2</sup>

## 12. Carbapenem-resistant Gram-negative Bacilli (CRGNB)

Gram-negative bacilli commonly encountered in healthcare settings include species such as *Pseudomonas aeruginosa*, *Acinetobacter* spp. and *Stenotrophomonas maltophilia*, and species belonging to the Enterobacteriaceae family, such as *Escherichia coli*, *Klebsiella pneumoniae*, and *Enterobacter cloacae*. Carbapenem-resistant *Enterobacteriaceae* are resistant to carbapenem antimicrobials (e.g., imipenem, meropenem, ertapenem) through the production of carbapenemase.

Carbapenem resistance develops as a result of the production of carbapenem-hydrolysing enzymes. These enzymes are usually encoded by genes carried on mobile genetic elements such as plasmids which can rapidly spread amongst related bacterial genera. Some notable examples of recently identified carbapenemases are:

- *Klebsiella pneumoniae* carbapenemase (KPC) which is found mostly in *K. pneumoniae* but also in other Enterobacteriaceae. KPC producing microorganisms have caused major healthcare related outbreaks in Greece, Israel and north eastern USA;
- The OXA-type resistance genes found in *Acinetobacter* spp. Carbapenem-resistant *Acinetobacter* has been identified worldwide but is currently rarely seen in Canadian hospitals.
- Metallo- $\beta$ -lactamases which are mostly found in *P. aeruginosa* and *Acinetobacter* spp., and rarely in other Enterobacteriaceae; and include the **New Delhi metallo beta-lactamase (NDM-1 enzyme)** found mostly in *Escherichia coli* and *K. pneumoniae*, but also seen in other Enterobacteriaceae. The **New Delhi metallo beta-lactamase (NDM-1 enzyme)** has recently been identified in India and Pakistan and in patients hospitalized in other countries after receiving healthcare in India and Pakistan.<sup>5</sup>

ARO education fact sheets for staff and patient/residents available in Appendix A.

## 13. Colonization versus Infection

Colonization is the presence, growth and multiplication of a microorganism in or on a body site without signs and symptoms of illness.

Infection refers to tissue invasion by the microorganism with multiplication and overt signs and symptoms of illness (fever, increased white blood cell count, purulence, inflammation etc.).

## 14. General Principles for Infection Prevention and Control

*It is expected that there will be differences in approaches between acute, long-term prehospital and home/community care settings with regard to prevention and control of AROs. It is impractical and unnecessary to implement the same degree of control measures in every setting across the continuum of care.*

The following guidelines address general screening, precautions and other strategies in the control of AROs when caring for colonized or infected patients in acute, long term, home and community care settings.

It is recommended that each DHA & the IWK develop a comprehensive, strategic plan to detect, prevent and control infection and colonization with AROs. Judicious use of antibiotics should also be emphasized in order to limit the increase and spread of antibiotic resistant microorganisms.

It is expected that there will be differences in the approaches between acute, long-term, prehospital and home/community care settings with regard to prevention and control of AROs. It is impractical and unnecessary to implement the same degree of control measures in every setting across the continuum of care. See appropriate sections: Pre hospital care, Acute, Long Term Care, Home and Community Care for healthcare setting specific recommendations.

## 15. Routine Practices

Routine Practices (RP) is the term used by the PHAC to describe the system of infection prevention and control practices recommended to prevent and control transmission of microorganisms in healthcare settings. Consistent use of Routine Practices with all clients/patients/residents is critical to preventing transmission of microorganisms from client/patient/resident to client/patient/resident and to staff.

Four elements include: hand hygiene, risk assessment, risk reduction and education.

The United States (US) uses the term “Standard Precautions/Practices”, which is synonymous with “Routine Practices”. RP is the base upon which additional precautions are applied as indicated by the nature of the microorganism or syndrome encountered. These practices describe prevention and control strategies to be used with **all** clients/patients/residents during **all** care, and include:

***The US term “Standard Precautions / Practices” is synonymous with “Routine Practices”.***

PHAC’s “Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare.”  
<http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html>

Safer Healthcare  
Now

Hand Hygiene  
Education Module for  
Healthcare Workers  
and Volunteers -

<http://www.saferhealthcarenow.ca/EN/HandHygiene/StopCleanYourHandsDay/Pages/default.aspx>

Hand hygiene with an alcohol-based hand rub (ABHR) or with antimicrobial soap and water before and after physical contact with a client/patient/resident, or with a contaminated environment.

Personal protective equipment (PPE) to be worn to prevent healthcare worker contact with blood, body fluids, secretions, excretions, non-intact skin, or mucous membranes includes:

- gloves when there is a risk of hand contact with blood, body fluids, secretions, excretions, non-intact skin, or mucous membranes; gloves shall be used as an additional measure, not as a substitute for hand hygiene.
- a long-sleeved gown if contamination of uniform/clothing or skin is anticipated.
- a mask and eye protection or a face shield where appropriate to protect the mucous membranes of the eyes, nose, and mouth during procedures and care activities likely to generate splashes or sprays of blood, body fluids, secretions, or excretions.

Clients/patients/residents who visibly soil the environment, or for whom appropriate hygiene cannot be maintained, shall be placed in single rooms with dedicated toileting facilities. This includes mobile clients/patients/residents with fecal incontinence if stools cannot be contained in diapers and clients/patients/residents with draining wounds who do not keep their dressings in place.

Preventing injuries from needles, scalpels, and other sharp devices; never recap used needles. Place sharps in approved sharps containers.

Careful handling of soiled linen and waste to prevent personal contamination and transfer to other clients/patients/residents.

Cleaning and disinfecting all equipment that is being used by more than one client/patient/resident between uses according to the recommendations found in the PHAC guideline.

## II. Additional Precautions for ARO

### 1. Initiation of Additional Precautions

In addition to Routine Practices, Additional Precautions have been necessary to prevent and control the spread of AROs in healthcare settings. Additional Precautions shall be instituted as soon as indicated by triggering mechanisms such as diagnosis, recognition of symptoms of infection, laboratory information, or assessment of risk factors (e.g. screening). For a client/patient/resident who

has, or is suspected of having, infection or colonization with MRSA, VRE, ESBL or CRGNB, it is important to institute these Additional Precautions immediately.

In some infection prevention and control programs, Additional Precautions are instituted before laboratory confirmation for clients/patients/residents believed to be at particularly high risk of being colonized or infected with AROs. These may include: clients/patients/residents with a recent history of hospitalization in countries with high endemic rates of AROs, roommates (contacts) of clients/patients/residents newly identified as being colonized/infected with an ARO. Decisions about the initiation of Additional Precautions in these circumstances need to be based on:

- The speed with which information about colonization/infection can be obtained.
- The likelihood of transmission (based, for instance, on the client/patient/resident risk factors and the amount of transmission that has occurred on the particular unit in the past).
- Clients/patients/residents with compromised immune systems (e.g. bone marrow transplant) are more at risk of illness if transmission occurs than clients/patients/residents with elective short stay surgeries.
- The risks of transmitting MRSA or VRE shall also be balanced against the risks of placing such clients/patients/residents on Additional Precautions.
- Adaptations of these additional precautions are practiced in other settings such as long-term care and home care.

## 2. Contact Precautions

Contact Precautions is the term used by the PHAC to describe additional practices to reduce the risk of transmitting infectious agents that are normally spread via contact with an infectious person.<sup>5</sup> Contact Precautions are used in addition to Routine Practices.

**Contact Precautions** include:

- Hand hygiene as described in Routine Practices. Appropriate patient placement as described in Routine Practices (e.g. single room, cohort).
- Gloves for entering the patient's room or bed space.
- Long-sleeved gown for contact with patient, bed space, frequently touched environmental surfaces or objects. In acute care, putting on a gown on room entry may be advisable.
- Dedicated use of equipment or adequate cleaning and disinfecting of shared equipment.
- Visitor Contact Precautions for MRSA and VRE include:
  - If a visitor is in contact with other patients or is providing direct patient care, they shall wear the same PPE as healthcare workers. Visitors shall receive education regarding hand hygiene and the appropriate use of PPE.

### 3. Screening for AROs

Undiagnosed ARO colonization or infection in patients can contribute to the spread of AROs within a facility. In recent years AROs have become more common occurrences in healthy individuals living in the community or in individuals with no prior admission to a hospital. Screening recommendations will be outlined in each care setting.

### 4. Role of the Laboratory

Infection Prevention and Control programs must have an established working relationship with a microbiology laboratory.

There has been much discussion of the role of PCR testing in screening for MRSA colonization. In Nova Scotia, we have a relatively low prevalence of MRSA colonization. At the Queen Elizabeth II Health Sciences Centre, approximately 1% of patients screened for MRSA have a positive culture. If we generalize this rate of 1% to the rest of the province, we can estimate the positive predictive value of a PCR test. Given that published specificities of PCR for detecting MRSA are in the range of 95%, labs using PCR for MRSA detection should expect to generate approximately five false positive PCR tests for every true positive. When patients are identified as MRSA colonized, there are substantial costs incurred both financially and personally (the cost and social isolation of contact precautions). Since, in dollar terms, the cost of a false positive MRSA could be in the hundreds of dollars, it is strongly advised that all positive tests be confirmed by culture. A Canadian Agency for Drugs and Technologies in Health (CADTH [www.cadth.ca/index.php/en/hta/reports-publications/search/publication/952](http://www.cadth.ca/index.php/en/hta/reports-publications/search/publication/952)), report concluded that PCR was useful in the setting of preemptive isolation (i.e. isolation of all patients until shown MRSA negative). They defined effectiveness as the number of MRSA colonizations avoided per year and cost as the incremental cost effectiveness ratio of the test versus no screening. When preemptive isolation was used, one of the molecular methods was the most cost effective at a cost of \$20,430/ colonization avoided. In the absence of preemptive isolation, the chromogenic agar was the most cost effective at \$4078/ colonization avoided, while the molecular method cost was \$17500/colonization avoided. The actual costs would differ based on the institution's isolation and other laboratory costs. Turnaround time for laboratory results is another factor to consider when choosing screening tests. Batching tests to make PCR more cost effective negates its time advantage. Due to the low prevalence of MRSA colonization in NS, the provincial Public Health Laboratory recommends chromogenic agar as the most cost effective methodology for MRSA screening in NS health care facilities.

Screening for other multidrug resistant organisms is based on culture methods. Vancomycin resistant enterococci may be detected in the course of screening programs, and isolates of enterococci from specimens are screened for

vancomycin resistance routinely. Isolates that are suspected of being resistant are referred for confirmatory testing. Susceptibilities are not performed on isolates from screening specimens but isolates that are causing infection are tested for additional antimicrobials at the CDHA laboratory.

Screening is available for multi-drug resistant *Acinetobacter* spp. for selected populations at high risk. Generally, laboratories refer the specimens to CDHA for screening, as the specialized medium needs to be made up for each specimen, and is not available in most regional hospital laboratories. Advance notice to the CDHA laboratory is useful to expedite processing whenever possible.

Other multidrug resistant gram negative organisms, including extended spectrum beta lactamase producers, carbapenemase producers, and isolates that are resistant by other mechanisms are detected in the course of routine work up of specimens and screening programs for these organisms are not used to detect carriage. Isolates that are found to be multi drug resistant may be referred to CDHA for confirmatory testing, for additional testing of other antimicrobials, and for further characterization. Some isolates are referred on to the National Laboratory in Winnipeg for investigation.

## 5. Notification/Flagging

Tracking clients/patients/residents who are colonized or infected with AROs (e.g. by flagging their chart or electronic file) and their contacts has been shown to improve identification and appropriate management of such clients/patients/residents on re-admission.

ARO colonized/infected clients/patients/residents should be educated to notify healthcare providers of their positive ARO status. A process should be in place to ensure that patients discharged from hospital receive communication regarding positive culture results. The receiving healthcare setting, family physician, or the physician most responsible for their care should be notified of the screening results.

Electronic flagging is the responsibility of the hospital generating the specimen report. In the event that isolates are identified within a facility whose electronic patient database is not interfaced with the home hospital, then the home hospital shall be notified. It is the home hospital that is responsible for establishing the flag.

Newly identified MRSA or VRE isolates shall be communicated by laboratory services to public health services, the client/patient/resident's family physician and the District Health Authority/IWK ICP.

The language used in NS hospitals for electronic flagging uses the following terminology: MRSA/VRE positive hx – acronym of hospital – day/month/year abbreviation and MRSA/VRE contact – acronym of hospital.

Terminology shall be consistent across the province for interpretation and education purposes.

Refer to the Ontario Ministry of Health and Long-Term Care document, “Best Practices for Cleaning, Disinfection and Sterilization in All Healthcare Settings” for guidance relating to equipment cleaning and disinfection (available online at: [http://www.health.gov.on.ca/english/providers/program/infectious/diseases/ic\\_cds.html](http://www.health.gov.on.ca/english/providers/program/infectious/diseases/ic_cds.html)), as well as Health Canada’s document, “Canada Communicable Disease Report, Infection Control Guidelines, Hand Washing, Cleaning, Disinfection and Sterilization in Healthcare,” available from: <http://www.hc-sc.gc.ca/hpb/lcdc>, and CDC’s document, “Guidelines for Environmental Infection Control in Health-care Facilities”, available from: [http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Enviro\\_guide\\_03.pdf](http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Enviro_guide_03.pdf)

## 6. De-Flagging

The duration of colonization with all AROs *is* not well defined. Based on the likelihood of clearing MRSA, DHAs/IWK may opt to de-flag a client/patient/resident if over a period of eighteen months they have had at least three consecutive negative swabs while not on antibiotics. If there is a positive result, the eighteen month waiting period starts again. The swabs should be done no closer than monthly during the eighteen month period. Carriers are to be re-cultured during any subsequent admissions. Swabs should not be collected within one week of finishing a course of antibiotics.

**See appendix B algorithm adapted from CDHA**

## 7. Accommodations

Recommendations will be outlined in each care setting.

## 8. Environment and Equipment

MRSA, VRE and CRGNB have been isolated from various healthcare surfaces including door handles, hydrotherapy tubs, gowns and linens, hospital furnishings, client/patient/resident charts, tourniquets, call bells, telephones, computer keyboards, faucets, and medical equipment such as glucose meters, blood pressure cuffs, electronic thermometers, and intravenous fluid pumps.

Widespread contamination of VRE is likely to occur in the rooms of clients/patients/residents who have diarrhea, and VRE may survive on surfaces for days or weeks.<sup>2</sup>

Hospital grade disinfectants are effective against MRSA, VRE and ESBL, and general routine cleaning and disinfection methods are adequate for dealing with MRSA and ESBLs. However, routine cleaning may not be adequate to remove VRE from contaminated surfaces. Studies have shown that surface cultures for VRE remain positive when a cloth is dipped back into a cleaning solution after use and re-used on another surface; when supplies in the room are re-used after discharge; when there is insufficient contact time between the disinfectant solution and the surface being cleaned; and when surfaces are sprayed and wiped, rather than actively scrubbed. There has also been reported

success in ending an outbreak of VRE using intensive environmental disinfection with twice-daily cleaning.<sup>2</sup>

Current disinfecting protocols will be effective if they are diligently carried out and properly performed using friction (scrubbing) and conscientious cleaning of patient-care surfaces, such as bed rails, and frequently touched surfaces, such as hallway handrails, at least once daily. Processes for cleaning and disinfection should include sufficient contact time for disinfectants, appropriate strength of solutions used, use of damp dusting, working from clean to dirty areas and eliminating the practice of dipping a cloth into the cleaning solution after use and reusing it on another surface<sup>2</sup>.

## **9. Patient Care Equipment**

Where possible, dedicated patient care equipment that will not be shared between patients is recommended for patients known to be colonized or infected with an ARO. Reusable equipment that has been in direct contact with one patient should be appropriately reprocessed before use by another patient. Items that are routinely shared should be cleaned between patients.

- Equipment that is visibly soiled should be cleaned immediately
- Commodes, like toilets, should be cleaned regularly and when soiled
- Bedpans should be reserved for use by a single patient and labeled appropriately
- Procedures should be established for assigning responsibility and accountability for routine cleaning of all patient care equipment
- Soiled patient care equipment should be handled in a manner that prevents exposure of skin and mucous membranes and contamination of clothing and the environment
- Personal care supplies (e.g. lotions, creams, soaps) should not be shared between patients
- Nail polish, cuticle conditioner used in hand/foot care programs should not be shared

## **10. ESBL and Environmental Surfaces**

Although evidence to date has not identified the environment to be highly associated with transmission the same diligence in cleaning environmental surfaces is required as for MRSA and VRE.

## **11. Cleaning During Outbreaks**

Outbreaks require more frequent cleaning of horizontal surfaces and frequent “high touch” areas such as bed rails, call bells, over bed tables, work surfaces, doorknobs and hallway hand rails. There has been reported success in using intensive environmental disinfection with twice-daily cleaning.

## 12. Linen and Garbage Disposal

Routine healthcare cleaning practices for laundering linens are adequate for eliminating AROs.

- a) All used linens shall be considered to be contaminated and shall be handled appropriately.
- b) Linens shall be changed upon discharge of a client/patient/resident with AROs in all healthcare settings, including ambulatory care.
  - wash soiled linen in hot water with detergent
  - dry thoroughly in hot air dryer
  - follow hygienic procedures for the handling and storage of clean and soiled linen.

Regular impermeable linen hampers can be used and soiled items may be treated as regular laundry. Simply deposit laundry securely into the hamper while avoiding touching the outsides.

For AROs all curtains (privacy, window, and shower) shall be removed and laundered when soiled by, and after discharge of, a client/patient/resident. Double bagging is not required. Garbage from rooms with patients colonized or infected with an ARO does not require special precautions. Garbage should be handled in accordance with the facility's regular waste disposal policies.<sup>2</sup>

## 13. Dishes and Utensils

Clients/patients/residents with MRSA, VRE, and ESBL may use regular dishes. Disposable dishes are not required. All soiled dishes and utensils may be washed with other clients/patients/residents' soiled dishes.

## 14. Decolonization Therapy

Decolonization therapy is the use of topical and/or oral antimicrobial agents (e.g. topical antibiotics, oral antibiotics, antimicrobial body washes) in ARO colonized patients for the purpose of eliminating the colonized state.

### 14.1. MRSA

Decisions whether to treat MRSA colonized individuals with a decolonization protocol in an effort to eradicate MRSA are not straight forward. There are differing opinions regarding the benefits and risks of decolonization, as well as many different approaches towards the actual decolonization regimen. To date, most of the published literature has not demonstrated a long-term benefit to routine decolonization of MRSA colonized individuals. The decision regarding decolonization must be individualized for each situation and each patient. Studies have reported up to 40% recurrence rates and repeated therapy has resulted in the emergence of mupirocin resistant strains. However, there may be circumstances where decolonization for a particular patient/resident may be of benefit. For assistance with decision making see decolonization decision algorithm in Appendix C.

## 14.2.VRE, ESBLs, CRGNB

There is no clinically proven decolonization regimen for VRE, ESBL and CRGNB.

## 15. Occupational Health Considerations

The risk of healthcare workers acquiring an ARO during the course of their work is low and is significantly reduced if Routine Practices, including performing hand hygiene and wearing PPE, are consistently and correctly applied. All healthcare workers will receive education in the proper use of Routine Practices as a fundamental aspect of infection prevention and control in healthcare settings, with emphasis on hand hygiene and appropriate use of PPE.<sup>2</sup>

## 16. Screening Healthcare Workers

Routine screening of healthcare workers for the presence of ARO colonization is not recommended. Screening of staff for MRSA shall be considered when an outbreak of the same strain of MRSA continues to spread, despite adherence to control measures, or when an individual is epidemiologically linked to transmission of MRSA to clients/residents/patients.

In this situation, identifying colonized HCWs through screening as part of an outbreak investigation would only be done at the direction of IPC, under the supervision of Occupational Health, and in conjunction with the investigation of

other possible sources of transmission.

Prior to proceeding with any HCW screening a discussion between OHS, IPC, diagnostic laboratories, and the public health is recommended. If screening cultures are determined necessary they should be collected at the beginning of the day, before the healthcare worker has had any contact with patients/residents or the facility environment.

## 17. Employment

Employment in any field cannot be denied solely on the basis of colonization or infection with an ARO.

## 18. Routine Pre-employment Screening

Routine pre-employment screening of healthcare workers for colonization with AROs is not required.

## III. Education

### 1. Education for Healthcare Workers

Education for healthcare workers regarding the epidemiology and specific precautions pertaining to ARO prevention and control should be developed to

ensure that they are educated appropriately. Education may improve compliance with Routine Practices and Additional Precautions, and most attempts to control MRSA, VRE, ESBLs and CRGNB have included healthcare worker education as part of the strategy. See Appendix A.

## **2. Patient Education**

Patient education should cover hygiene practices for preventing the transmission of infections, such as hand hygiene, not sharing personal items and cough etiquette. Education should include an explanation of the precautions being used, and the rationale behind their use. See Appendix A.

## **3. Visitors**

Visitors should be instructed regarding specific institution/agency control measures, and hand hygiene before and after visiting should be emphasized. See Appendix A.

## **4. Antibiotic Stewardship**

The emergence of MRSA, VRE, ESBLs and CRGNB is associated with the overuse of antibiotics. The risk of MRSA infection has been related to the duration and frequency of prior antibiotic use. In addition, excessive use of antibiotics is thought to promote the spread of MRSA by reducing resistance to colonization in clients/patients/residents and by giving resistant strains a survival advantage.<sup>6</sup>

It is recommended that policies and procedures be implemented to promote judicious antibiotic use. Healthcare settings shall institute formulary control of antibiotics and shall conduct regular reviews of antibiotic utilization.<sup>7, 8</sup>

## **5. Program Evaluation**

An ongoing review of both processes and outcomes is important to prevent the spread of MRSA, VRE or ESBLs. It is recommended that ARO prevention and control programs shall contain elements that support ongoing quality management and improvement. That include:

- a. Regular audits of screening practices, management of equipment, hospital cleaning and disinfection practices, including reprocessing of shared equipment and healthcare worker adherence to Routine Practices, particularly hand hygiene, shall be conducted and feedback provided on the results. Refer to CHICA-Canada Infection Control Audit Toolkit [http://chica.org/inside\\_products.html#audittoolkit](http://chica.org/inside_products.html#audittoolkit) or contact IPCNS for more information.
- b. It is important to have frontline healthcare workers, administrators, and the infection prevention and control committee review surveillance data and provide feedback that may prompt a review of practices and prevention measures:

- i. Collate and analyze data. This may be facilitated by a data management system.
    - ii. Generate facility-associated infection rates.
    - iii. Create standardized reports from the data.
    - iv. Share rates and trends with staff.
  - c. There shall be an ongoing plan of action to improve the processes and outcomes.<sup>9</sup>
    - i. Prepare action plans to address issues that require education or changes in practice.

## 6. Pets

Policies regarding visiting pets should be made individually by each facility. It is not the sole jurisdiction of infection control as there are many other equally important elements that require inclusion in a pet policy (e.g. safety, allergies etc.).

MRSA is emerging in pet populations throughout the world. The role of pets in transmission of MRSA is still unclear; however, recent evidence suggests that MRSA can be transmitted between persons and their pets. Molecular typing of MRSA isolates from domestic animals indicates that they tend to be colonized with the same strains as humans in their area. The similarity between pet and human isolates has led to speculation that pet MRSA is closely linked to human MRSA and that the source of MRSA in pets may often be colonized humans.<sup>10</sup>

## 7. Hydrotherapy Pools

Large total immersion pools that are used for patient treatments should follow guidance provided by the NS Agriculture. Smaller tubs used for treatment of conditions such as burns and wounds may have aeration units that draw water into them and then force it back out. It is difficult to ensure disinfection of this type of aeration unit and there are new models available that are more reliably cleaned. However, if this type of tub is the only one available, cleaning practices should include:

- Patients/residents/clients with active infections are not allowed in the pool/tub.
- Schedule ARO colonized clients to end of day whenever possible
- Follow manufacturer's instructions for type of disinfectant, dilution and contact time
- Clean unit as per manufacturer's instructions
- Fill to cover the aeration intake/outlet and add appropriate amount of disinfectant for the amount of water
- Turn on aerator and run for recommended contact time (usually 10 min.)
- Drain and rinse, wipe dry.

## 8. Outbreak Control

An outbreak of ARO occurs when there is an increase in the rate of new cases (infected and/or colonized) over the background rate, which could consist of, but is not limited to, a clustering of cases due to a new microbial strain(s) in a healthcare setting. Clustering is the occurrence of two or more cases closely related by time, location, or other epidemiologic linkages.

Every healthcare setting should have a policy, with clearly outlined procedures, regarding outbreak management, including ARO outbreaks. The policy should include forming a multidisciplinary outbreak team, the steps in outbreak investigation and management, reporting structures, and outbreak report development.

## Care Settings

In addition to the principles and practices discussed in the earlier sections of this document, this section presents information specific to different care settings.

## IV. Prehospital Care

There is no evidence that patients with AROs pose an excess risk for first responders or other patient transporters during the provision of prehospital emergency care if routine practices, including diligent hand hygiene, are used. The major emphasis should be on preventing cross-contamination to other patients. During long transport times, especially when more than one patient is being transported, special attention should be paid to hand hygiene between performing tasks with each patient. With this in mind, cleaning and disinfection of frequently touched surfaces and contaminated equipment are also important.

The crew should:

- Use an alcohol based hand rub for hand hygiene
- Wash hands at a sink with soap and water, if available, rather than alcohol based hand rub when hands are visibly soiled
- Use PPE (e.g. gowns, gloves, masks) according to routine practices, for protection from anticipated exposure to blood or body fluids. Remove and dispose of PPE safely at point of care
- Pay attention to when and how crew reports are written (perform hand hygiene between patient assessment and documentation)
- Remove gloves and perform hand hygiene prior to driving the ambulance
- As per usual clean patient contact surfaces within the vehicle and on the stretcher with detergent disinfectant after the transfer or emergency call
- As per usual clean or wipe down all equipment within the vehicle (blood pressure cuffs, monitors) that was used on one patient with a disinfectant before use on another patient.
- Linen should be changed between all patients, regardless of colonization or infection status.

## V. ACUTE CARE HOSPITALS

Infection prevention and control programs for MRSA and VRE should include strategies for early identification of colonized clients/patients/residents through active screening and the use of Additional Precautions for preventing transmission, thereby reducing the prevalence and incidence of both colonization and infection, improving patient outcomes, and reducing healthcare costs. See Appendix D for Sample Investigation Protocols for MRSA and VRE in Acute Care Facilities.

The role of admission screening for ESBLs is controversial. Except for those who have a documented past history of ESBL, the populations at risk are not well defined and vary among the published literature. A recent Canadian study <sup>15</sup> concluded that further research is needed to better define the target population for screening. There is also no consensus on whether one negative culture should be accepted as evidence that the patient has cleared the ESBL, or if successive cultures are required. Therefore admission screening for ESBL is not recommended.

The prevalence of VRE is very low in many NS hospitals and this microorganism does not commonly cause infections in most patient populations. Therefore, efforts in NS should be aimed at limiting the spread of this microorganism within the hospital population.

Laboratory testing for asymptomatic carriage of CRGNB is not routinely recommended. There is insufficient evidence to recommend routine screening (including epidemiologic risk screening and active surveillance culture screening) of patients for colonization with CRGNB. There should be a high index of suspicion for the presence of CRGNB in patients at risk for infection with these bacteria, particularly 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. <sup>5</sup>

The management of AROs in acute care facilities should be directed by infection prevention and control programs. Endemic rates of AROs vary greatly between geographic areas. Infection prevention and control strategies should be focused on reducing the risk or containing (preventing nosocomial transmission) AROs, depending upon population characteristics, transmission rates and available resources at each facility.

### 1. Screening

Unrecognized ARO colonization or infection in patients can contribute to the spread of AROs within a facility. MRSA and VRE spread largely because of the presence of colonized patients and the subsequent contamination of their environments. Identifying colonized patients allows contact measures to be implemented. In recent years, MRSA and ESBL colonization or infection has become more common in healthy individuals living in the community or in individuals with no prior admission to a hospital. This will impact negatively on

the ability to identify colonized patients by screening only individuals with prior hospital admission and emphasizes the importance of consistent and proper use of routine practices.

Most MRSA and VRE guidelines recommend some form of targeted screening of high-risk patients/residents, but differ in their definition of 'high-risk'<sup>1, 2</sup> with no conclusive evidence as to which patients/residents should be screened. Once an individual's risk of acquiring MRSA or VRE has been assessed, decisions may be made regarding screening protocols. Ongoing monitoring of local epidemiology and results of previous screening strategies should be used to determine whether modifications to screening protocols are required. Universal admission screening strategy of MRSA is not recommended and according to the literature does not reduce nosocomial MRSA infection.<sup>11, 12, 13</sup>

- Previous hospitalization and/or facility-based medical treatment in the past year.
- Resides in a Long Term Care facility
- Patients with breaks in skin integrity
- Chronic disease
- Tubes and catheters, skin infections
- Tracheostomies
- External fixators
- Selective antibiotic pressure.

## 2. Screening Admitted Patients for ARO Risk Factors

It is recommended that all District Health Authorities and the IWK have a program of active ARO screening for all patients admitted to hospital, which includes screening questionnaires for risk factors, followed by cultures if indicated. Ideally, this screening would be completed as a part of the initial patient assessment, or at least within 24 hours of admission. Each district may have different population demographics and environmental conditions that affect their epidemiology and the screening strategies they will use. Therefore, it is at the discretion of each District Health Authority and the IWK to determine which patient populations are deemed higher risk and require ARO screening cultures. Typically 2 sets of swabs are done, however, many DHAs /IWK have moved to 1 set of swabs based on the low percentage of positive results from the second set; this is an acceptable practice. See Appendix E for an example of a screening tool.

Risk factors for ARO colonization identified in the literature include patients having previous hospitalization and/or facility-based medical treatment (patients shall be assessed for hospitalization history for a minimum period of one year), Long Term Care clients/residents, patients with breaks in skin integrity, chronic disease (e.g. diabetes or cystic fibrosis), tubes and catheters, skin infections such as abscesses and furuncles, tracheostomies, external fixators, or those who are experiencing selective antibiotic pressure. These patients are considered as having a higher risk of colonization/infection of an ARO, or groups that have experienced outbreaks

## 3. Re-culture of Previously Positive Patients

The absence of an ARO on screening culture does not unequivocally mean that one is not present. The decision to re-culture previously colonized or infected

patients should be made on a regional or local basis in consultation with laboratory services. If not re-cultured, the patient previously known to be colonized with MRSA, VRE or CRGNB should be managed as though still MRSA, VRE or CRGNB positive. For ESBLs, if the infection has clinically resolved, cultures should be collected one month following antibiotic therapy.

#### **4. Screening Patients After Exposure**

In high risk acute care areas such as ICUs, burn units, transplantation units or cardiothoracic units, any patient potentially exposed to a known MRSA colonized or infected patient should have screening cultures performed. In some lower risk areas, this screening may be of value in outbreak situations.

#### **5. Swab Sites**

Choice of body sites for screening cultures should be made in consultation with IPC and laboratory services. Appendix F outlines culture sites and techniques.

#### **6. Precautions/Placement for Patients Colonized/Infected with an ARO**

- A private room is preferred, or cohorting with other patients colonized or infected with the same microorganism.
- Contact precautions should be applied for any direct contact with the patients or their immediate surroundings. Please refer to page 17 for contact precaution details.
- If an MRSA patient develops a respiratory tract infection, then the use of a surgical mask by the healthcare provider while providing direct care is recommended. This would not apply to VRE, ESBL or CRGNB.

#### **7. Activity Restrictions for Patients who are Colonized/Infected**

Healthcare workers need to educate patients and their families on transmission of AROs, and the importance of proper hand hygiene, especially as it pertains to activities outside of their room. Patients known to be ARO colonized or infected should minimize the time out of their rooms to essential tests, procedures, and therapies, including mobilization. This restriction should be balanced with the patient's need to mobilize. Failure to do so may result in prolonging the patient's hospital stay and placing him or her at a greater risk of further health complications.

It is not necessary for patients to be gowned or gloved to leave their rooms if they are demonstrably compliant with the following:

- performing hand hygiene before leaving room
- wearing clean clothing
- completely covering any open or draining wounds with dry, intact dressings
- returning to their care area if dressings leak or become soiled

- avoiding physical contact with other patients and/or the healthcare environment.

Any patient unable to comply with these instructions should be supervised by unit staff or other responsible individual when leaving the room.

## **8. Patients Leaving the Room for Diagnostic Testing or Other Procedures**

Unit staff should inform the receiving unit area of the patient's ARO status. The healthcare workers in the receiving unit must follow the same level of precautions as on the inpatient unit.

## **9. Decolonization and Treatment – See page 22**

## **10. Supplies**

Supplies should not be stockpiled in the room, as this may lead to their being needlessly discarded on patient discharge.

## **11. Bathing/Personal Items**

Patients known to be colonized or infected with an ARO are able to use the same bathing facilities as other patients. Special considerations:

- If possible, have this patient bath at end of the day
- Antimicrobial soaps are not required for routine bathing
- Special attention should be paid to all skin folds
- After use, thoroughly clean the bathtub or shower stall with a hospital approved disinfectant.

## **12. Discontinuing Precautions**

The absence of an ARO on screening culture does not unequivocally mean that one is not present. The decision to discontinue precautions on 'culture negative' patients must be made individually, based on patient characteristics and institutional policies. Experience has taught us that many patients become recolonized when exposed to antibiotics, or if their condition worsens.

If precautions are discontinued, it is recommended that these individuals be monitored for any change of clinical status or treatment with antibiotics while they remain in hospital. Any change in clinical status or antibiotic therapy may warrant re-culturing. Ensure everyone maintains in good compliance with hand hygiene and other routine practices.

## **13. Visitors**

Instruct visitors to perform hand hygiene before leaving the patient's room. Visitors should follow the same level of precautions as appropriate for the nature of their patient interaction, and should be instructed in proper hand hygiene and use of contact precautions. This includes gowns and gloves if assisting with care

or in contact with any patient articles, secretions or body fluids. Visitors should not visit other patients.

## 14. Surveillance

Surveillance for epidemiological purposes is defined as the ongoing, systematic collection, analysis, and interpretation of health data essential to planning, implementing, and evaluating public health practice, closely integrated with the timely dissemination of these data to those who need to know. It is a critically important component of an infection control program and allows for early detection of newly emerging pathogens, monitoring of trends, outbreak detection, and intervention evaluation. Surveillance of AROs at the unit, facility and health authority level should be based on local needs, under the direction of IPC programs and Public Health.

## 15. Surveillance Goals<sup>2</sup>

The goals of ARO surveillance are to:

- determine the burden of illness caused by AROs
- provide data, such as risk groups or factors, which inform infection prevention and control interventions
- provide data by which interventions can be evaluated
- provide data on trends over time, including changes in rates, affected populations or severity of illness
- detect outbreaks and clusters.

Surveillance data should include:

- results from screening of specific populations for the presence of MRSA/VRE
- results from cultures submitted for diagnostic purposes.

## 16. Surveillance Data

Surveillance data is used to set priorities, set benchmarks and evaluate the effectiveness of IPC efforts. Specific local and regional objectives for ARO surveillance should be determined by each of the health authorities based on sound methodology.

## 17. Outbreak Management

An ARO outbreak should be suspected when rates of new cases exceed baseline rates (or benchmark rates if a district does not have its own), or if a cluster of infections is identified. A cluster may be defined as more than one new case related to an existing case (index case) by time, location, or other epidemiological link to the index case.

The Infection Control Practitioner, laboratory, unit or facility manager, and senior administration (e.g. the facility Chief of Medicine, VP Patient Care Services)

should be notified anytime an outbreak is suspected. All outbreaks of infectious diseases are reportable to Public Health.

The infection control workers should be consulted regarding appropriate infection control precautions to implement or whether to begin further epidemiological investigations. See Appendix G: Steps in an Outbreak Investigation. In order to carry out an effective outbreak investigation the following activities should be considered:

- The institution may wish to seek advice from other acute care hospitals familiar with dealing with similar situations
- ARO colonized patients should be spatially separated from non-colonized patients
- Contact precautions should be put in place for infected or colonized patients, who should be placed in a single room. If single rooms are limited, patients may be cohorted with other colonized patients.
- Contact tracing of patients exposed to the colonized or infected patient(s) should be performed.
- For MRSA, obtain cultures from the anterior nares, groins or perineum, and wounds
- For VRE, obtain stool or rectal cultures
- For ESBLs, obtain urine and stool cultures
- Consider a repeat screen on two consecutive days for those patients exposed to VRE to improve the sensitivity of detection
- Review environmental cleaning and increase frequency of cleaning high touch surfaces
- Environmental cultures should be done only under the direction of IPC in order to manage the impact on the clinical laboratory. In settings where IPC resources are limited these activities may be coordinated directly with the laboratory
- Consider cohort staffing strategies to decrease transmission risk to non-colonized patients on the same unit
- Consider closing unit to new admissions until outbreak under control

## **VI. LONG TERM CARE**

These care guidelines apply to all residential care facilities (RCF): rehabilitative care, palliative care, complex care, psychiatric care, detox units and discharge planning/transition units.

### **1. Introduction**

There are important differences between acute care hospitals and long term care facilities (LTCFs) with respect to infection control recommendations regarding prevention and control of AROs. An RCF is a resident's home and infection control precautions must be balanced with promoting an optimal, healthy lifestyle for the resident, particularly in view of the fact that colonization or infection with an ARO may persist indefinitely or may periodically re-emerge, despite

treatment or attempts at decolonization. Imposing precautions such as those required in acute care would interfere with social interaction and rehabilitative care and may result in isolation, depression, anger and other adverse outcomes.

Experience to date and results of epidemiological studies indicate that LTCF residents who are colonized or infected with these microorganisms do not endanger the health of LTCF workers or other residents when routine practices, especially diligent hand hygiene (See page 15), are consistently and properly applied. However, infected or colonized residents are a potential reservoir for introduction of these microorganisms into acute care hospitals, should they require acute care admission.

## **2. Screening and Notification**

Routine ARO screening is not recommended for residents of LTCFs in NS.

## **3. Admission Assessment**

An assessment of risk factors for ARO colonization or infection is considered part of the long term care resident's general admission assessment. Each facility should base decisions regarding need for ARO screening cultures, room placement, and use of additional precautions on the results of this risk assessment.

## **4. Risk Assessment**

Factors that increase the likelihood that an individual is colonized or infected with an ARO include:

- recent transfer from an acute care hospital
- already known to be colonized or infected with a resistant pathogen
- contact with or proximity to a patient colonized or infected with an ARO
- the presence of a surgical wound, decubitus ulcer, or other chronic wound
- diagnosed with conjunctivitis or bacteremia
- the presence of invasive indwelling devices (intravascular lines, urinary catheter, endotracheal or tracheostomy tube, gastrostomy feeding tube)
- recent antimicrobial therapy
- Malnutrition, immunosuppression (age- and/or medication-related).

Factors that increase the risk of a LTCF resident acquiring MRSA include:

- decubiti, other large open wounds, or skin lesions
- receipt of broad-spectrum antibiotics that select for the emergence of resistant strains
- the presence of invasive indwelling devices (intravascular lines, urinary catheter, endotracheal or tracheostomy tube, percutaneous endoscopic gastrostomy feeding tube)
- debilitated and/or bed bound and requires extensive hands on care
- malnutrition or immuno-suppression (age- and/or medication-related)

- recent cycle of institutionalization and hospitalization.

If the admission assessment indicates that the resident is known to be infected or colonized or is considered to be at high risk for an ARO, then use the following guidelines for room placement and additional precautions, in addition to routine practices.<sup>14</sup>

Admission should not be denied or delayed by a RCF on the basis of a potential resident's colonization or infection with an ARO. All RCFs should be prepared to implement the appropriate infection control measures and stringently follow Routine Practices for persons who are colonized or infected with an ARO.

## **5. Room Placement for Residents Known to be Infected/Colonized or at High Risk of an ARO**

Infections caused by MRSA and VRE (versus just colonization) are not common in LTC. It is of more concern in the hospital setting, where patients are at highest risk for developing serious infections, due to risk factors predominantly associated with acute illness. Therefore, there is not the clinical imperative (single room, separate bathroom facilities) to try and eliminate the potential for transmission. The focus in long term care and community care settings should be on basic infection prevention and control practices such as hand hygiene, appropriate use of personal protective equipment and disinfection of resident care equipment between uses.

When placing clients/residents known to be colonized or infected with MRSA, the following criteria should be applied:

- a) In Long Term Care settings, based on a case-by-case review, clients/residents may be placed with a roommate(s) who do(es) not have MRSA and they can share toileting facilities.
- b) In Long Term Care settings, MRSA clients/residents shall not share a room with:
  - i. Individuals who have open wounds, decubitus ulcers, or non-intact skin.
  - ii. Individuals who have urinary catheters, feeding tubes, or other invasive devices.

In Long Term Care settings, clients/residents who are VRE colonized and have good hygiene with no diarrhea, no ostomy, etc, may be placed with a roommate(s) who do (es) not have VRE and they can share toileting facilities.

- If the client/resident has diarrhea, ostomy etc. they should be placed in a single room with a private bathroom.
- residents who are incontinent, uncooperative, and considered to be cognitively impaired, are poor candidates for sharing rooms with others

In Long Term Care settings, clients/residents who are ESBL infected or colonized may be placed with a roommate who does not have ESBL and share toileting

facilities except those individuals who have urinary catheters, feeding tubes, or other invasive devices, draining wounds or uncontrollable diarrhea.<sup>15</sup>

In Long Term Care settings, clients/residents who are CRGNB infected or colonized should be placed in a private room on contact precautions.<sup>5</sup>

Placement decision should include the following considerations:

- Regardless of room selection, adherence to routine practices is essential.
- Other considerations: roommates and their families do not need to be advised of the colonization status of the resident with an ARO - in fact this would constitute a breach of confidentiality
- the resident's room door does not need to be closed
- ARO colonized or infected clients/residents can share bathing facilities ensuring that there is the usual scrupulous disinfection after use.
- bed location within the room may reduce the risk of transmission. Preferably their bed should be located where there is easy access to the bed from all directions, without having to touch a neighboring bed
- temporary relocation may be necessary if the status of ARO colonized or infected residents changes in a way that bacterial shedding increases i.e. develop signs and symptoms of infection that cannot be contained.
- residents with VRE, ESBL or CRGNB developing significant diarrhea and/or fecal incontinence, especially during or after receiving antibiotic therapy
- residents with MRSA developing a significant desquamating skin condition.

## **6. Control Measures - routine practices. See page 15**

## **7. Routine Practices for Infected/Colonized Residents**

Personal Protective Equipment (PPE), such as gowns or plastic disposable aprons and gloves, should be used if the resident is known or suspected to be infected/colonized and if direct contact with blood and body fluids is anticipated or significant contamination of the environment is occurring.

Examples of significant contamination of the environment include:

- uncontrolled diarrhea that cannot be contained in diapers or incontinence briefs and resident is not confined to bed.
- draining infected wound in which drainage cannot be contained by dressing.
- excessive skin desquamation.

Gowns/aprons/gloves must always be changed between patients.<sup>3</sup>

## **8. Resident Activities**

Restricting resident activities would interfere with residents' social interaction and rehabilitative care. In general, residents colonized or infected with an ARO may

use common living areas, recreational and socializing areas, and dining facilities. They should not be confined to their room or restricted in their activities or interaction with other resident. Hand hygiene should be encouraged with all the residents.

In circumstances where an ARO colonized or infected resident poses a short term (days or a few weeks) higher risk of infection because of a temporary change in clinical status, a resident's activities may be modified or curtailed during this time.

If at all possible, ensure that residents with the following symptoms refrain from participation in group activities until symptoms are resolved:

- VRE colonized or infected residents who have diarrhea

## **9. Decolonization and Treatment – see pages 22**

## **10. Preventing Environment Soiling**

To prevent soiling of the environment:

- open wounds or chronic lesions that are colonized or infected should always be covered by clean, dry dressings or clothing
- use incontinence products, and tissues to minimize environmental soiling.

## **11. Resident's Care Equipment**

All designated equipment and supplies should be identified and stored in a manner that prevents use by or for other residents:

- commodes should be dedicated for individual residents use whenever possible, especially if the resident cannot be relied upon to prevent contamination
- urine catheters should always be emptied into individual designated clean containers that are not carried from resident to resident
- care equipment that cannot be dedicated to a single resident must be laundered or thoroughly cleaned and disinfected before use on another resident
- equipment and supplies should not be brought into the room unless necessary.

## **12. Slings/Transfer Belts**

Slings associated with mechanical lifts may be a source of spread of AROs, especially if the resident has an exposed open wound or is incontinent of urine or stool. Simply wiping off the sling is unlikely to reduce transmission. Slings should be dedicated to the specific resident whenever possible. If it is impossible to dedicate the slings then a barrier such as a plastic sheet or incontinence pad should be placed between the resident and the sling to prevent soiling of the sling. All slings should be laundered regularly.

### 13. Bathing

Most LTCF residents are bathed weekly. Recent experience suggests that increased frequency of bathing with a plain soap is effective in reducing the microbial burden of AROs on a resident's skin. All residents must have their own bath towel, which must not be shared with others. After each use, all bathtubs should be cleaned and disinfected as per the manufacturer's recommendations.

### 14. Hydrotherapy Pools – see page 25

### 15. Signage

Signs are neither recommended nor required to be placed on the door or at the entrance to the room of a resident who is colonized or infected with an ARO. If specific infection control measures are required, a sign for staff or visitors may be placed inside the room in a location where it will be readily apparent to healthcare workers, other care staff, or visitors (for example, adjacent to the staff hand hygiene sink or hand hygiene product). The sign should only indicate the recommended infection control measures and not the resident's diagnosis.

### 16. Medical records/Kardexes/Care plans

ARO status/culture results will normally be recorded in the medical record. Information regarding ARO status and/or culture results may be included in the kardex and care plans so that healthcare workers will be aware of any special precautions or notes regarding room placement or use of dedicated equipment for the particular resident.

### 17. Cleaning Requirements – please see pages 19-21

### 18. Discharge Cleaning

Upon discharge of an ARO colonized or infected resident, special attention should be given to the cleaning of visibly soiled areas or places where hands may have touched:

- clean hand rails, doorknobs, over bed tables, toilet flusher, sink faucets
- any equipment that had been kept in the room must be cleaned with a germicidal agent before being returned to service
- housekeeping staff should wear either regular, reusable housekeeping gloves, or disposable gloves, when cleaning
- hand hygiene should be performed after removing gloves
- if reusable gloves are used, disinfect gloves with the facility's approved disinfectant before using in another resident's room
- case-by-case consultation with the facility Infection Control Practitioner, Director of Care, facility Medical Advisor, IPCNS or Public Health department is recommended if uncertain whether additional cleaning requirements may be necessary. (This may occur in cases where there

may be high levels of environmental contamination from a resident who is incontinent).

## 19. Surveillance

All residential facilities should develop a method to keep track of known ARO infections/colonization in residents

At present, each health authority has its own system for surveillance and tracking healthcare associated infections. Therefore it is recommended that long term care facilities use the mechanisms already in place to track and report numbers of patients who are admitted with an existing ARO infection/colonization. IPCNS or public health can provide assistance with surveillance.

Once a surveillance system is established, each facility will obtain baseline rates. The facility and/or region will then be able to quickly identify a cluster or outbreak of infections above baseline, implement control interventions, and then be able to assess the success or failure of the interventions by comparing specific ARO incidence rates before and after the intervention.

## 20. Outbreak Management

If an outbreak is suspected notify the person in the facility responsible for infection control, the facility Medical Director, and the Unit/Site Manager. Outbreaks of ARO **infections** are reportable to the local Medical Health Officer. Follow usual outbreak protocol/policies currently in place.

# VII. HOME AND COMMUNITY CARE

## 1. Introduction

There are important differences between acute care hospitals and home and community services with respect to infection control recommendations. Home and Community Care Programs must balance infection control precautions with promoting an optimal, healthy lifestyle for the client, particularly in view of the fact that colonization or infection with an ARO may persist indefinitely or may periodically re-emerge, despite treatment or attempts at decolonization.

Experience to date does not indicate that clients who are colonized or infected with these microorganisms pose a health risk to healthcare workers as long as routine practices<sup>3</sup> are closely followed. See page 22

Hand hygiene and handling, cleaning and disinfection of shared equipment carried to and from the home are the most important ways to reduce risk of transmission and infection with any ARO. AROs are readily transmitted to others via the unwashed hands of care providers that become contaminated from touching clients, clients' environments, and shared equipment.

## 2. Admission

Admission to Home and Community Care services should *not* be denied or delayed on the basis of colonization or infection with an ARO.

## 3. Level of Infection Control Precautions

Routine practices including regular hand hygiene and environmental cleaning are the essential and primary infection control measures for all Home and Community Care clients at all times, including persons colonized or infected with an ARO. See page 17.

**These guidelines cover management of all strains of MRSA or other ARO colonization or infection in any client being cared for in a home or community setting.**

## 4. Client Activities

The need for infection control must be balanced with promoting an optimal, healthy lifestyle for the client, particularly in view of the fact that colonization with an ARO may persist indefinitely. Clients colonized or infected with an ARO may participate in all recreational and social activities. Open wounds or lesions should be covered with clean, dry dressings.

## 5. Clients and Household Members

Teach, encourage and remind clients who are able to participate in self-care of the importance of hand hygiene, especially after using the toilet and before eating or preparing food. Clients who have difficulty in self-care should be assisted in washing their hands. They should also be taught use of an alcohol based hand rub. Emphasize the importance of proper hand hygiene technique and the importance of hand hygiene for other household members of clients who are colonized or infected with an ARO.

## 6. Bathing

There is no evidence that AROs are more resistant to removal from the skin than are antibiotic sensitive microorganisms. Use of antimicrobial soap is not necessary; regular soap should be used. The clients' towels should not be shared with others. After bathing, the bathtub should be cleaned and disinfected with a suitable household disinfectant compound.

## 7. Clients' Care Equipment and Supplies

Limit the amount of reusable equipment that is brought into the home of clients/patients in general, including those infected or colonized with AROs. Minimize disposable supplies going into the home (e.g. dressings). Dedicate patient care equipment, if possible and leave in the home until the patient is discharged from home care services. The equipment should be cleaned and properly disinfected after the patient is discharged. Place reusable

items in a plastic bag for transport to another site for subsequent cleaning and disinfection. Clean and disinfect any patient care equipment (e.g. stethoscopes) that cannot remain in the home before removing them from the home.

## 8. Cleaning Requirements

Consistent, regular cleaning assists in reducing the potential for environmental transmission of microorganisms. MRSA, VRE, ESBL and GRGNB can be effectively removed from the environment through regular housekeeping and cleaning practices, and can be inactivated by using a variety of household cleaning and disinfectant products. The following should be considered when cleaning in home and community settings:

- Use disinfectants as per manufactures directions and allow to air dry to ensure sufficient "contact time" to inactivate these microorganisms
- wear regular, reusable housekeeping gloves that are left in that home. Wash the gloves between uses.
- spills of moist body substance should be cleaned up as soon as possible.

## VIII. Group Homes for the Physically and Mentally Challenged

There is no need to disrupt housing arrangements if a household member is colonized or infected with an ARO. Residents colonized or infected with an ARO may participate in all recreational and social activities.

Regular hand hygiene with plain soap and water or an alcohol based hand rub and environmental cleaning are the essential and primary infection control measures for all residents at all times, including persons colonized or infected with an ARO.

Other persons living in the household should be taught good hand hygiene technique and the importance of good personal hygiene.

### 1. Doctors Offices/Outpatient Clinics/Dental Offices

ARO colonized or infected patients do not need to be segregated in the office or seen late in the day. Hand hygiene and preventing the transmission of AROs spread by direct contact such requires consistent application of appropriate infection and control practices. Patients may harbor resistant bacteria as part of their respiratory, skin, or gastrointestinal tract flora for an extended period.

Patients known to be carriers of these microorganisms should have this indicated in their medical record in order to facilitate recognition on subsequent visits. .

Please see College of Physicians and Surgeons of Nova Scotia: Policies and Guidelines for Infection Prevention and Control in the Physician's Office  
<http://www.cpsns.ns.ca/PhysicianGuidelinesandPolicies.aspx><sup>16, 17</sup>

### 2. Cleaning in Clinics

Following the visit of any patient, soiled surfaces should be cleaned (example,

examination tables or chairs) with a low-level detergent disinfectant product. Clean the contact surface of any equipment used on the patient (e.g. stethoscopes). It should be explained to cleaning staff that antibiotic resistance does not mean disinfectant resistance. Therefore, emphasize to staff that thorough disinfection practices with recommended disinfectants will effectively remove bacterial contamination from surfaces and therefore they are not at risk from AROs.<sup>16,17</sup>

## **IX. Community (Workplace, School, Child Care, Shelters)**

There is no need to disclose colonization with AROs in the workplace, school or child care setting. Admission to school, child care, or shelters should not be denied or delayed on the basis of colonization or infection with an ARO. Anyone entering the workplace, school, child care or shelter setting should cover all weeping/draining wounds or skin lesions with a clean dry dressing before entering any of these group settings.

Healthcare workers and food handlers who are colonized with an ARO must maintain excellent hygiene and hand hygiene practices and follow all food handling and occupational health policies for their jurisdiction.

## Glossary of Terms

**Additional Precautions:** These precautions (e.g. Contact Precautions) are carried out in addition to Routine Practices when MRSA or VRE are suspected or diagnosed. They include the physical separation of infected or colonized clients/patients/residents from other individuals to prevent, or limit, the transmission of the infectious agent from colonized or infected individuals to those who are susceptible to infection or to those who may spread the agent to others (previously referred to as “isolation”). Refer to “Assumptions for Infection Prevention and Control” on page 7, for details regarding Contact Precautions.

**Antibiotic Resistant Organism (ARO):** A microorganism that has developed resistance to the action of several antimicrobial agents and that is of special clinical or epidemiological significance.

**Bacteremia:** The presence of bacteria in the bloodstream.

**Case:** An individual who is infected or colonized with an antibiotic resistant microorganism.

**Client/patient/resident:** Any person receiving healthcare within a healthcare setting.

**Cohorting:** The sharing of a room or ward by two or more clients/patients/residents who are either colonized or infected with the same microorganism.

**Cohort Staffing:** The practice of assigning specified workers to care only for clients/patients/residents known to be colonized or infected with the same microorganism. Such workers would not participate in the care of clients/patients/residents who are not colonized or infected with that microorganism.

**Colonization:** The presence and growth of a microorganism in or on a body with growth and multiplication, but without tissue invasion or cellular injury. The client/patient/resident will be asymptomatic.

**Colonization Pressure:** Large number of colonized patients in a given geographical location.

**Community-associated Methicillin-resistant *Staphylococcus aureus* (CA-MRSA):** There are two different definitions of CA-MRSA: one is based on epidemiology and one is based on microbiologic types. Isolates of CA-MRSA are obtained from individuals who develop infections in the community and who have not had recent exposure to the healthcare system (epidemiologic definition). These are usually particular strains of MRSA (e.g. CMRSA-10) that are different from the MRSA strains found in hospitals (e.g. CMRSA-2), with a different methicillin-resistance gene (*mecIVa*, vs. *mecII*) and often with additional virulence factors (microbiologic definition). Because hospital-type MRSA strains can be transmitted in the community and community-type MRSA strains can be transmitted in hospitals; these two definitions may not always both apply to a client/patient/resident with CA-MRSA.

**Contact:** An individual who is exposed to a person colonized or infected with an antibiotic resistant microorganism in a manner that allows transmission to occur (e.g. roommate).

**Contact Precautions:** Additional practices to reduce the risk of transmitting infectious agents via contact with an infectious person. Contact Precautions are used **in addition to** Routine Practices. Refer to “Assumptions for Infection Prevention and Control” on page 7 for details regarding Contact Precautions.

**Contamination:** The presence of an infectious agent on a body surface, on clothes, gowns, gloves, bedding, toys, surgical instruments, dressings, or other inanimate objects.

**CRGNB:** Carbapenem Resistant Gram-Negative Bacilli are multiple antibiotic-resistant gram-negative bacilli that are becoming increasingly common due both to selective antibiotic pressure as well the transfer of patients from other countries with endemic resistance patterns

**Decolonization:** The use of topical and systemic antimicrobials to eradicate colonization of resistant bacteria.

**Direct Care:** Providing hands-on care, such as bathing, washing, turning client/patient/resident, changing clothes/diapers, dressing changes, care of open wounds/lesions, or toileting. Feeding, pushing a wheelchair and routine housekeeping are not classified as direct care.

**Endemic:** The constant presence of a disease or infectious agent within a certain area.

**Enterococci:** Facultative anaerobic Gram-positive coccoid bacteria that live in the gastrointestinal tract of most individuals.

**ESBL:** 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 (including third generation) and render them ineffective for treatment.

**Fomites:** Those objects in the inanimate environment that may become contaminated with microorganisms and serve as a vehicle of transmission.

**Hand Hygiene:** A process for the removal of visible soil and removal or killing of transient microorganisms from the hands. Hand hygiene may be accomplished using soap and running water (for removal of visible soil) or the use of an alcohol-based hand sanitizer (when hands are not visibly soiled). Optimal strength of alcohol-based hand sanitizers shall be 60% to 90% alcohol. Refer to Appendix F, “Hand Hygiene Fact Sheet” for more information about hand hygiene.

**Healthcare-associated Infection (HAI):** A term relating to infections that are acquired during the delivery of healthcare (also known as “nosocomial infection”).

**Healthcare Facility:** A set of physical infrastructure elements supporting the delivery of health-related services. A healthcare facility does not include a client/patient/resident’s home or physician offices where healthcare may be provided.

**Healthcare Setting:** Any location where healthcare is provided, including settings where emergency care is provided, hospitals, Long Term Care homes (nursing homes, homes for the aged, residential care facilities and community based options settings), mental health facilities, outpatient clinics, community health centres and clinics, physician offices, dental offices, offices of allied health professionals, and home healthcare.

**Health Hazard:** A condition of premise; a substance, thing, plant, animal or organism other than a human; a solid, liquid or gas; radiation, noise, vibration or heat; or an activity that presents or may present a threat to the public health.

**Hospital-grade Disinfectant:** A disinfectant that has a drug identification number (DIN) from Health Canada indicating its approval for use in Canadian hospitals.

**Infection:** The entry and multiplication of an infectious agent in the tissues of the host. Asymptomatic or subclinical infection is an infectious process running a course similar to that of clinical disease but below the threshold of clinical symptoms. Symptomatic or clinical infection is one resulting in clinical signs and symptoms (disease).

**Infection Prevention and Control:** Evidence-based practices and procedures that, when applied consistently in healthcare settings, can prevent or reduce the risk of transmission of microorganisms to healthcare workers, other clients/patients/residents, and visitors.

**Infection Control Professional(s) (ICPs):** Trained individual(s) responsible for a healthcare setting's infection prevention and control activities, such as the designated infection prevention and control expert in the facility, or individuals with specific infection prevention and control training and expertise.

**Infectious Agent:** A microorganism, such as a bacterium or virus, that is capable of invading body tissues, multiplying, and causing disease.

**Isolate:** A pure strain of a bacterium that has been cultured in the laboratory.

**Long Term Care Settings:** Nursing Homes, Homes for the Aged, Residential Care Facilities, and Community Based Options Settings.

**Methicillin-resistant *Staphylococcus aureus* (MRSA):** MRSA are strains of *Staphylococcus aureus* that have an MIC to oxacillin of  $\geq 4$  mcg/ml or contain the *mecA* gene coding for penicillin binding protein 2a (PBP 2a). They are resistant to all of the beta-lactam classes of antibiotics (such as penicillins, penicillinase-resistant penicillins (e.g. cloxacillin) and cephalosporins).

**Methicillin-sensitive *Staphylococcus aureus* (MSSA):** MSSA are strains of *Staphylococcus aureus* that have an MIC to oxacillin of  $\leq 2$  mcg/ml. They may be treated with the beta-lactam classes of antibiotics (such as penicillinase-resistant penicillins (e.g. cloxacillin) and cephalosporins).

**Minimum Inhibitory Concentration (MIC):** The lowest concentration of an antibiotic that will inhibit growth of a microorganism.

**Nosocomial Infection:** Infection acquired during the delivery of healthcare (also known as “Healthcare-associated Infection”).

**Outbreak:** For the purposes of this document, an outbreak is an increase in the number of cases (colonizations or infections) above the number normally occurring in a particular healthcare setting over a defined period of time.

**Personal Protective Equipment (PPE):** Clothing or equipment worn for protection against hazards.

**Precautions:** Interventions to reduce the risk of transmission of microorganisms (e.g. client/patient/resident-to-client/patient/resident, client/patient/resident-to-staff, staff-to-client/patient/resident, contact with the environment, contact with contaminated equipment).

**Prehospital Care:** Acute emergency patient assessment and care delivered in an uncontrolled environment by designated practitioners, performing delegated medical acts at the beginning of the healthcare continuum.

**Prevalence Screen:** Screening all clients/patients/residents in a defined area (e.g. on a specific unit) at a specific point in time to determine how many are colonized with a specific microorganism.

**Public Health Agency of Canada (PHAC):** A national agency focused on efforts to prevent chronic diseases and injuries and responsive to public health emergencies and infectious disease outbreaks by working closely with provinces and territories to help reduce pressures on the healthcare system. These activities were originally part of Health Canada and, in this document, Health Canada and PHAC are referred to synonymously.

**Reservoir:** Any person, animal, or environmental surface in which an infectious agent survives or multiplies.

**Routine Practices:** The system of infection prevention and control practices recommended by the PHAC to be used with all clients/patients/residents during all care to prevent and control transmission of microorganisms in healthcare settings. Refer to Assumptions for Infection Prevention and Control on page 7 for details regarding Routine Practices.

**Screening:** A process to identify clients/patients/residents at risk for being colonized with MRSA and/or VRE and, if risk factors are identified, obtaining appropriate specimens. Refer to Appendix N, “Collecting Specimens for MRSA and VRE” for examples of screening tools.

**Sentinel Event:** A colonization/infection in which the occurrence of perhaps even a single case may signal the need to re-examine preventive practices.

**Surveillance:** The systematic ongoing collection, collation, and analysis of data with timely dissemination of information to those who require it in order to take action.

**Staff:** Anyone conducting activities within a healthcare setting that will bring him/her into contact with clients/patients/residents including: all healthcare providers (e.g.

emergency service workers, physicians, dentists, nurses, respiratory therapists, and other allied health professionals, students), support services (e.g. housekeeping), volunteers, and contract workers.

***Staphylococcus aureus***: Aerobic Gram-positive coccoid bacteria commonly found on the skin and mucous membranes (especially anterior nares) of some individuals. *Staphylococcus aureus* is the most common cause of healthcare-associated infections.

**Terminal Cleaning**: The cleaning of a client/patient/resident room or bed space following discharge or transfer of the client/patient/resident, in order to eradicate contaminating microorganisms that might be acquired by subsequent occupants.

**Vancomycin-resistant *Enterococci* (VRE)**: VRE are strains of *Enterococcus faecium* or *Enterococcus faecalis* that usually have a minimal inhibitory concentration (MIC) to vancomycin of  $\geq 32$  mcg/ml. They contain the resistance genes VAN-A or VAN-B.

**Vancomycin-Intermediate *Staphylococcus aureus* (VISA)**: VISA is a strain of MRSA that has an MIC to Vancomycin of 8 to 16 mcg/ml.

**Vancomycin-Resistant *Staphylococcus aureus* (VRSA)**: VRSA is a strain of MRSA with an MIC to vancomycin of  $\geq 32$  mcg/ml. VRSA resistant genes are usually transferred from VRE strains.

## Appendix A

### Sample Fact Sheets for Healthcare Staff (MRSA, VRE, ESBL, CRGNB) and Sample Information Sheets for Patients and Visitors

#### **METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA) Information Sheet for Clients/patients/residents and Visitors**

##### **What is MRSA?**

*Staphylococcus aureus* is a germ that lives on the skin and mucous membranes of healthy people. Occasionally, *Staphylococcus aureus* can cause an infection. When *Staphylococcus aureus* develops resistance to certain antibiotics, it is called methicillin-resistant *Staphylococcus aureus*, or MRSA.

##### **How is MRSA spread?**

MRSA is spread from one person to another by contact, usually on the hands of caregivers. MRSA can be present on the caregiver's hands either from touching contaminated material excreted by the infected person or from touching articles contaminated by the skin of a person with MRSA, such as towels, sheets, and wound dressings. MRSA can live on hands and objects in the environment.

##### **What special precautions are required for MRSA?**

It is important that special precautions are taken to stop MRSA from spreading to other clients/patients/residents in the hospital. These precautions include:

- Single room accommodation (the door can remain open).
- A long-sleeved gown and gloves shall be worn by everyone who cares for you.
- A sign may be placed on your door to remind others who enter your room about the special precautions.
- The room and the equipment used in the room will be cleaned and disinfected regularly.
- Everyone who leaves your room shall clean their hands well.
- You shall clean your hands before you leave your room.

##### **What about family/visitors?**

Your family and visitors shall not assist other clients/patients/residents with their personal care as this may cause the germ to spread. Family and visitors may be required to wear a long-sleeved gown and gloves while in your room. Before leaving your room, visitors shall remove the gloves and gown and dispose of them in the garbage container and/or the linen hamper located in your room. Then, your family and visitors shall clean their hands.

##### **Good hand hygiene practices**

Remind all staff and visitors to practice good hand hygiene before and after they touch

you. Ask your nurse or doctor to demonstrate proper hand hygiene techniques (15 seconds of soap and running water OR waterless alcohol-based hand sanitizer until hands are dry).

**You need to clean your hands:**

- After using the bathroom.
- After blowing your nose.
- Before eating and drinking.
- Before and after you touch your dressing or wounds.
- When your hands are visibly dirty (soiled).
- Before you leave your room.

**What will happen at home?**

If you have MRSA at the time of discharge from hospital, the chance of spreading the germ to your family is small. But, we do recommend that you practice the following:

- Everyone who might help you with your personal hygiene or with going to the toilet shall wash their hands after contact with you.
- Wash your hands before you make any food and before you eat. This practice shall be followed by everyone in the household.
- Wash your hands well after using the toilet. Make sure others that use the bathroom wash their hands well afterwards.
- Clothing may be laundered in the same manner as the rest of the household laundry.
- No special cleaning of furniture or items (e.g. dishes) in the home is required.
- Always tell your physician, paramedics, nurses or other care providers that you have MRSA. This helps prevent spread to others.

## **VANCOMYCIN RESISTANT *ENTEROCOCCUS* (VRE)**

### **Information Sheet for Clients/Patients/Residents and Visitors**

#### **What is VRE?**

*Enterococci* are germs that live in the gastrointestinal tract (bowels) of most individuals and, generally, do not cause harm (this is termed “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 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 an infected person or from touching articles soiled by feces. VRE can survive well on hands and can survive for weeks on inanimate objects such as toilet seats, taps, door handles, bedrails, furniture, and bedpans. VRE is easy to kill with the proper use of disinfectants and good hand hygiene.

#### **What special precautions are required for VRE?**

It is important that special precautions are taken to stop VRE from spreading to other clients/patients/residents in the hospital. These precautions include:

- Single room accommodation (the door can remain open).
- A long-sleeved gown and gloves shall be worn by everyone who cares for you.
- A sign may be placed on your door to remind others who enter your room about the special precautions.
- The room and the equipment used in the room will be cleaned and disinfected regularly.
- Everyone who leaves your room shall clean their hands well.
- You shall wash your hands before you leave your room.

#### **What about family/visitors?**

Your family and visitors shall not assist other clients/patients/residents with their personal care as this may cause the germ to spread. Family and visitors may be required to wear a long-sleeved gown and gloves while in your room. Before leaving your room, visitors shall remove the gloves and gown and dispose of them in the garbage container and/or the linen hamper located in your room. Then your family and visitors shall clean their hands.

#### **Good hand hygiene practices:**

Remind all staff and visitors to practice good hand hygiene before and after they touch you. Ask your nurse or doctor to demonstrate proper hand hygiene techniques (15 seconds of soap and running water OR waterless alcohol-based hand sanitizer until hands are dry).

### **You need to clean your hands:**

- After using the bathroom.
- After blowing your nose.
- Before eating and drinking.
- Before and after you touch your dressing or wounds.
- When your hands are visibly dirty (soiled).
- Before you leave your room.

### **What will happen at home?**

If you have VRE at the time of discharge from hospital, the chance of spreading the germ to your family is small. But, we do recommend you practice the following:

- Everyone who might help you with your personal hygiene or with going to the toilet shall wash their hands after contact with you.
- Wash your hands before you make any food and before you eat. This practice shall be followed by everyone in the household.
- Wash your hands well after using the toilet. Make sure others that use the bathroom wash their hands well afterwards.
- Clothing may be laundered in the same manner as the rest of the household laundry.
- No special cleaning of furniture or items (e.g. dishes) in the home is required.
- If you share a bathroom at home, clean the toilet and sink, at least weekly, with a germicidal cleanser.
- Always tell your physician, paramedics, nurses, or other care providers that you have VRE. This helps prevent spread to others.

## EXTENDED SPECTRUM BETA-LACTAMASE PRODUCING BACTERIA (ESBL) Information Sheet for Patients and Visitors

### What are ESBLs?

ESBL-producing bacteria are a group of bacteria that produce enzymes called 'beta-lactamases'. These enzymes break down commonly used antibiotics so that the antibiotics don't work and a different antibiotic may need to be used to treat the infection. Some people carry ESBL-producing bacteria but do not have an infection.

### How are ESBLs spread?

ESBL-producing bacteria can be spread to other people directly through touch, if hands are unwashed, or indirectly by contact with soiled equipment and, particularly urine-care equipment such as catheters and urinals.

### What special precautions are required for ESBLs?

It is important that special precautions are taken to stop ESBL from spreading to other patients in the facility. These precautions include:

- Single room accommodation (the door can remain open)
- A long-sleeved gown and gloves may be worn by everyone who cares for you
- A sign may be placed on your door to remind others who enter your room about the special precautions
- The room and the equipment used in the room will be cleaned and disinfected regularly
- Everyone who leaves your room must clean their hands well
- You must clean your hands before you leave your room

### What about family/visitors?

Your family and visitors may visit you. Your family and visitors should not assist other patients with their personal care as this may cause the germ to spread. They may be required to wear a long-sleeved gown and gloves while in your room. Before leaving your room, visitors must remove the gloves and gown and dispose of them in the garbage container and the linen hamper located in your room. Then they must clean their hands.

### Good hand hygiene practices:

Remind all staff and visitors to practice good hand hygiene before and after they touch you. Ask your nurse or doctor to demonstrate proper hand hygiene techniques (15 seconds of soap and running water OR alcohol-based hand rub until hands are dry).

### You need to clean your hands:

- After using the bathroom
- After blowing your nose
- Before eating and drinking
- Before and after you touch your dressing or wounds
- When your hands are visibly dirty (soiled)
- Before you leave your room

## What will happen at home?

- If you have ESBL at the time of discharge from hospital, the following practices are recommended:
- Everyone who might help you with your personal hygiene or with going to the toilet should wash their hands after contact with you.
- Wash your hands before you make any food and before you eat. This practice should be followed by everyone in the household.
- Wash your hands well after using the toilet. Make sure others that use the bathroom wash their hands well afterwards.
- Clothing may be laundered in the usual manner, and along with, the rest of the household laundry.
- No special cleaning of furniture or items (e.g. dishes) in the home is required.
- If you share a bathroom at home, clean the toilet and sink at least weekly with a household cleanser.
- Always tell your physician, paramedics, nurses or other care providers that you have ESBL. This helps prevent spread to others and helps your doctor choose the right antibiotics if necessary.

## **Carbapenem Resistant Gram Negative Bacilli – Fact Sheet for Patients in Acute Care**

### **Information Sheet for Patients and Visitors (adapted from PICNET Feb 2011)**

#### **What is Carbapenem Resistant Gram Negative Bacilli?**

Gram negative bacilli are one of the major types of bacteria that are present in and around our bodies. Most do us no harm however some gram negative bacteria have developed resistance to a class of antibiotics called Carbapenems. This makes treating an infection (if it does occur) 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 at risk to keep the bacteria contained.

#### **How do people acquire this?**

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 transferred 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.

Healthcare professionals will also 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 be able to cause an infection. The problem is the choices for treatment are very limited for the resistant gram negative bacteria.

Tell your primary doctor that you were told that you have Carbapenem resistant gram negative bacilli. If you return to another hospital please tell your physician or nurse as well. Bathe regularly with soap and water. It is best not to share personal hygiene items such as towels and washcloths. Keep your bathroom environment clean, common household detergents are perfectly acceptable cleaning agents.

#### **What about family/visitors?**

Family and visitors can visit you. Healthy family and visitors have a low risk of acquiring infection with CRE. All visitors must be instructed by the staff on how to use Additional Precautions. Children and infants should be closely supervised. We ask that your visitors only visit you and your room, and to do the following:

- Clean their hands before entering your room and when leaving

- Not to use your bathroom
- Not to eat or drink in your room

### **Good hand hygiene practices:**

Remind all staff and visitors to practice good hand hygiene before and after they touch you. Ask your nurse or doctor to demonstrate proper hand hygiene techniques (15 seconds of soap and running water OR alcohol-based hand rub until hands are dry).

#### **You need to clean your hands:**

- After using the bathroom
- After blowing your nose
- Before eating and drinking
- Before and after you touch your dressing or wounds
- When your hands are visibly dirty (soiled)
- Before you leave your room

### **What about at home?**

Do not forget that bacteria are always present in and around our bodies; almost all of them are not harmful and may be useful however you should always wash your hands routinely. Always wash your hands before eating or preparing food, after using the toilet or other personal hygiene activities.

## Methicillin-Resistant *Staphylococcus aureus* (MRSA) Staff Fact Sheet

### What is MRSA?

*Staphylococcus aureus* is a bacterium that periodically lives on the skin and mucous membranes of healthy people. Occasionally, *Staphylococcus aureus* can cause an infection. 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 by contact, usually on the hands of caregivers. MRSA can be present on the caregiver's hands either from touching contaminated material excreted by the infected person or from touching articles contaminated by the skin of a person with MRSA, such as towels, sheets, and wound dressings. MRSA can survive well on hands and can survive for weeks on inanimate objects, such as door handles, bedrails, client/patient/resident charts, pagers, and stethoscopes.

### Colonization and infection

*Colonization* occurs when bacteria are present on, or in, the body without causing illness. MRSA can colonize the nose, skin, and moist areas of the body.

*Infection* occurs when bacteria get past the person's normal defenses and cause disease (e.g. skin bacteria getting into the bloodstream via an intravenous catheter). Infections with MRSA may be minor, such as pimples and boils, but serious infections may also occur, such as surgical wound infections and pneumonia.

### Do all healthcare workers have MRSA?

No this is a myth...

### 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.
- Recent hospitalization in healthcare facilities.
- Previous hospitalization or transfer between healthcare facilities.
- Presence of an indwelling device (e.g. catheter).

### Good hand hygiene practices

Remind all staff and visitors to practice good hand hygiene before, and after, client/patient/resident contact/care. Healthcare staff shall 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 waterless, alcohol-based hand sanitizer or soap and running water for at least 15 seconds.

### Hand hygiene shall occur:

- Before and after each client/patient/resident contact.
- Before performing invasive procedures.
- Before preparing, handling, serving, or eating food.
- After care involving the body fluids of a client/patient/resident and before moving to another activity.
- Before putting on, and after taking off, gloves and PPE.
- After personal body functions (e.g. blowing one's nose).
- Whenever there is doubt about the necessity for doing so.
- When hands accidentally come into contact with secretions, excretions, blood, and body fluids.
- After contact with items in the client/patient/resident's environment.

### Prevention and control of MRSA in acute care:

1. Admission screening for MRSA shall be completed:
  - Check for previous history of MRSA, or high risk for MRSA, using an admission screening tool.
  - If the patient has previously had contact with an MRSA case, screening specimens shall be obtained.
  - If the patient is considered to be at risk for MRSA based on the results of the screening tool, screening specimens shall be obtained.
2. If the patient is known to have had MRSA in the past, **Additional Precautions** shall be initiated and will include:
  - Performing hand hygiene as described in Routine Practices.
  - Ensuring appropriate patient placement.
  - Wearing gloves when entering the patient's room or bed space in Acute Care or for direct care of the client/resident in Long Term Care.
  - Donning a long-sleeved gown when entering the patient's room or bed space in Acute Care or for direct care of clients/residents in Long Term Care, if contamination is likely.
  - Donning a surgical mask, if deemed necessary.
  - Using dedicated equipment or providing adequate cleaning and disinfecting of shared equipment, including transport equipment.
  - Performing daily cleaning of all touched surfaces in the room.
3. Notify the Infection Control Professional (ICP) or delegate to discuss the infection control management of client/patient/resident activities.
4. Precautions are **not** to be discontinued until reviewed by an ICP.
5. Additional surveillance specimens for colonization or patient contact(s) may be required, as directed by an ICP.

### Family and visitors

1. All families/visitors shall practice good hand hygiene before entering, and after leaving the patient's room.

2. Families/visitors who provide direct care shall wear the same PPE as staff. “Direct care” is defined as providing hands-on care, such as bathing, washing, turning the patient, changing clothes/diapers, dressing changes, care of open wounds/lesions, and toileting. Feeding individuals and pushing a wheelchair are not classified as direct care.
3. Provide written information for patients that explains the precautions required.

### Prevention and control of MRSA in long term care:

1. In Long Term Care, routine screening for MRSA or VRE is generally not recommended.
2. Long Term Care facilities may swab to ensure appropriate room placement of a high-risk client/resident. A facility may opt to increase screening based on the knowledge of an outbreak or uncontrolled transmission in a transferring facility.
3. If the client/resident is known to have had MRSA in the past, **Additional Precautions** shall be initiated and will include:
  - Performing hand hygiene as described in Routine Practices.
  - Ensuring appropriate client/resident placement.
  - Wearing gloves for direct care of clients/residents.
  - Donning a long-sleeved gown for direct care of clients/residents in Long Term Care, if contamination of the uniform is likely.
  - Donning a surgical mask, if deemed necessary.
  - Using dedicated equipment or providing adequate cleaning and disinfecting of shared equipment, including disinfection of transport equipment.
  - Performing daily cleaning of all touched surfaces in the room.
4. Clients/residents can participate in activities unless further restrictions have been identified by the ICP.
5. Precautions are **not** to be discontinued until reviewed by an ICP.

### Family and visitors

1. All families/visitors shall practice good hand hygiene before entering, and after leaving, the client/resident room.
2. Families/visitors who provide direct care shall wear the same PPE as staff. “Direct care” is defined as providing hands-on care, such as bathing, washing, turning the client/resident, changing clothes/diapers, dressing changes, care of open wounds/lesions, and toileting. Feeding individuals and pushing a wheelchair are not classified as direct care.
3. Provide written information for clients/residents that explains the precautions required.

## Vancomycin Resistant *Enterococcus* (VRE) Staff Fact Sheet

### 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 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 from touching articles soiled by feces. VRE can survive well on hands and can survive for weeks 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, making them susceptible to infection. These conditions include clients/patients/residents with:

- Recent hospitalization in healthcare facilities.
- Critical illness(es) in intensive care units.
- Severe underlying disease or weakened immune systems.
- Urinary catheters.
- Exposure to (or contact with) a client/patient/resident with VRE.
- Antibiotic use, particularly vancomycin.

### Good Hand Hygiene Practices

Remind all staff and visitors to practice good hand hygiene before, and after, client/patient/resident contact/care. Healthcare staff shall 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 waterless, alcohol-based hand sanitizer or soap and running water for at least 15 seconds.

#### Hand hygiene shall occur:

- Before, and after, each client/patient/resident contact.
- Before performing invasive procedures.
- Before preparing, handling, serving, or eating food.
- After care involving the body fluids of a client/patient/resident.
- Before moving to another activity.
- Before putting on, and after taking off, gloves and PPE.
- After personal body functions (e.g. blowing one’s nose).

- Whenever there is doubt about the necessity for doing so.
- When hands accidentally come into contact with secretions, excretions, blood, and body fluids.
- After contact with items in the client/patient/resident's environment.

## Prevention and Control of VRE

1. Admission screening for VRE shall be completed:
  - Check for previous history of VRE, or high risk for VRE, using the admission screening tool.
  - If the client/patient/resident has been a contact of a VRE case in the past, screening specimens shall be obtained.
  - If the client/patient/resident is considered to be at risk for VRE based on the results of the screening tool, screening specimens shall be obtained.
2. If the client/patient/resident is known to have had MRSA in the past, **Additional Precautions** shall be initiated and will include:
  - Performing hand hygiene as described in Routine Practices.
  - Ensuring appropriate client/patient/resident placement.
  - Wearing gloves when entering the patient's room or bed space in Acute Care or for direct care of clients/residents in Long Term Care.
  - Donning a long-sleeved gown when entering the patient's room or bed space in Acute Care or for direct care of clients/residents in Long Term Care, if contamination is likely.
  - Using dedicated equipment or providing adequate cleaning and disinfecting of shared equipment, including transport equipment.
  - Performing daily cleaning of all touched surfaces in the room.
3. Notify the Infection Control Professional (ICP) or delegate to discuss the infection control management of client/patient/resident activities.
4. Precautions are **not** to be discontinued until reviewed by an ICP.
5. Additional surveillance specimens for colonization or client/patient/resident contact(s) may be required, as directed by an ICP.

## Family and Visitors

1. All families/visitors shall practice good hand hygiene before entering, and after leaving, the client/patient/resident's room.
2. 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/diapers, dressing changes, care of open wounds/lesions, and toileting. Feeding individuals and pushing a wheelchair are not classified as direct care.
3. Provide written information for clients/patients/residents that explains the precautions required.

## Carbapenem-resistant Gram-negative Bacilli (CRGNB) Fact Sheet for Healthcare Professionals (adapted from PICNET Feb 2011)

### What are Gram-negative bacilli?

Gram-negative bacilli commonly encountered in healthcare settings include species such as *Pseudomonas aeruginosa*, *Acinetobacter* species, *Stenotrophomonas maltophilia*, and species belonging to the Enterobacteriaceae family, such as *Escherichia coli*, *Klebsiella pneumoniae*, and *Enterobacter cloacae*.

### What are Carbapenem-resistant Gram-negative bacilli?

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 alternative treatments available. Carbapenem resistant gram negative bacteria have been identified in several countries including the United States and the United Kingdom. There are some early reports that suggest a link between the receipt of medical care in certain overseas countries, most notably India and Pakistan, and carriage of these resistant bacteria.

### How is it Transmitted?

The most common form of transmission is by contact; both direct and indirect.

### Screening of Patients

Patients admitted to acute care facilities who have recently been an inpatient in any foreign country (including the USA) during the past 3-6 months should have the following swabs sent: sputum (if able), wounds (if present), perirectal, and urine (if catheterized or signs & symptoms of UTI). This is in addition to other routine appropriate admission screens (e.g. MRSA, VRE). There is no indication to either screen or use additional precautions in residents/clients in other non-acute healthcare settings including prehospital care.

### Precautions

Place patients with known or suspected (pending results) carbapenem infection or colonization on **Contact Precautions**. A single room is preferred. If respiratory infection is also suspected, use **Droplet and Contact Precautions**.

### Cleaning

All horizontal and frequently touched surfaces should be cleaned **twice daily** in rooms of individuals confirmed to carry this organism.

### Discontinuing Precautions

Consult Infection Control. If a patient is confirmed as being colonized or infected with CRGNB, Contact Precautions should continue for the duration of the hospitalization during which the CRGNB was isolated. Patients readmitted within 12 months of that hospitalization should be considered colonized with CRGNB and placed on Contact Precautions.

### **What Are the Risks to Healthcare Providers?**

There is no indication that these organisms are any easier to acquire or more likely to cause infection than any other antibiotic resistant organism. This is especially true for healthy individuals. The use of diligent hand hygiene and protective barriers as outlined in Contact Precautions will minimize the risk of transmission.

## EXTENDED SPECTRUM BETA-LACTAMASE PRODUCING BACTERIA (ESBL) Staff Fact Sheet (adapted from PIDAC)

### 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 (including third generation) and render them ineffective for treatment. If ESBL-producing bacteria cause an infection, a different antibiotic may need to be used to treat the infection. People who carry ESBL-producing bacteria without any signs or symptoms of infection are said to be colonized. The commonest ESBL-producing bacteria are some strains of *Escherichia coli* and *Klebsiella pneumoniae*.

### How are ESBLs spread?

ESBLs are spread via direct and indirect contact with colonized/infected patients and contaminated environmental surfaces. ESBLs are not airborne. ESBLs are most commonly spread via unwashed hands of healthcare providers.

### Risk factors for ESBL:

Risk factors for ESBL-producing bacterial acquisition include:

- Direct transfer from another hospital, nursing home, retirement home or other healthcare facility, including between facilities in the same healthcare corporation
- Any hospital, nursing home, retirement home or other healthcare facility admission in the past 1 year
- Patient receiving home healthcare 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)

ESBL-producing bacteria are becoming more common in the community.

### Good hand hygiene practices:

Remind all staff and visitors to practice good hand hygiene before and after client/patient/resident contact/care. Healthcare 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 & control of ESBLs:

1. Consistent use of Routine Practices with all patients/residents.
2. Admission screening:
  - Check for previous history of antibiotic-resistant organism. (ARO)
  - Complete the ARO screening tool for patients/residents
3. Initiate **Contact Precautions** for patients/residents with ESBL-producing bacteria:
  - 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
4. Notify the Infection Prevention & Control Professional or delegate to discuss the infection control management of client/patient/resident activities.
5. Precautions are **not** to be discontinued until reviewed by Infection Prevention and Control.
6. Additional surveillance specimens for colonization of client/patient/resident contact(s) may be required, as directed by Infection Prevention and Control.

### Family & Visitors:

All families/visitors must practice good hand hygiene before and after leaving the client/patient/resident's 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.

Families/visitors should not help other patients/residents with their personal care. This may cause ESBL to spread.

Provide written information for clients/patients/residents that explains the precautions required.

**MRSA Guide for Removing Carrier Flag  
August 2010**

Patient name \_\_\_\_\_

Unit # \_\_\_\_\_

Date of first positive culture \_\_\_\_\_

Site \_\_\_\_\_

**Criteria for Deflagging**

A period of eighteen months is required during which there will be **at least three consecutive negative** swabs. If there is a positive result, the eighteen month waiting period starts again. The swabs should occur at least quarterly during the eighteen month period. Carriers are to be re-cultured during any subsequent admissions. Swabs should not be collected within one week of finishing a course of antibiotics. Record culture status below:

| Date | Site | Result | Colonized | Infected | ICP Initials |
|------|------|--------|-----------|----------|--------------|
|      |      |        |           |          |              |
|      |      |        |           |          |              |
|      |      |        |           |          |              |
|      |      |        |           |          |              |
|      |      |        |           |          |              |
|      |      |        |           |          |              |
|      |      |        |           |          |              |
|      |      |        |           |          |              |

**Risk Factors that exclude a patient from consideration:**

| Risk Factor                                                                                           | Yes | No |
|-------------------------------------------------------------------------------------------------------|-----|----|
| Chronic dermatological condition such as eczema or psoriasis                                          |     |    |
| Unhealed or draining wounds/ulcers                                                                    |     |    |
| High risk immune compromised status or chronic medical conditions in consult with IC Medical Director |     |    |
| Frequent antibiotic therapy (more than once a year)                                                   |     |    |
| Frequent admissions to hospital (more than once a year)                                               |     |    |
| Requiring healthcare on a continuous basis in the community                                           |     |    |
| Chronic indwelling device                                                                             |     |    |

Meets requirements for status change yes  No

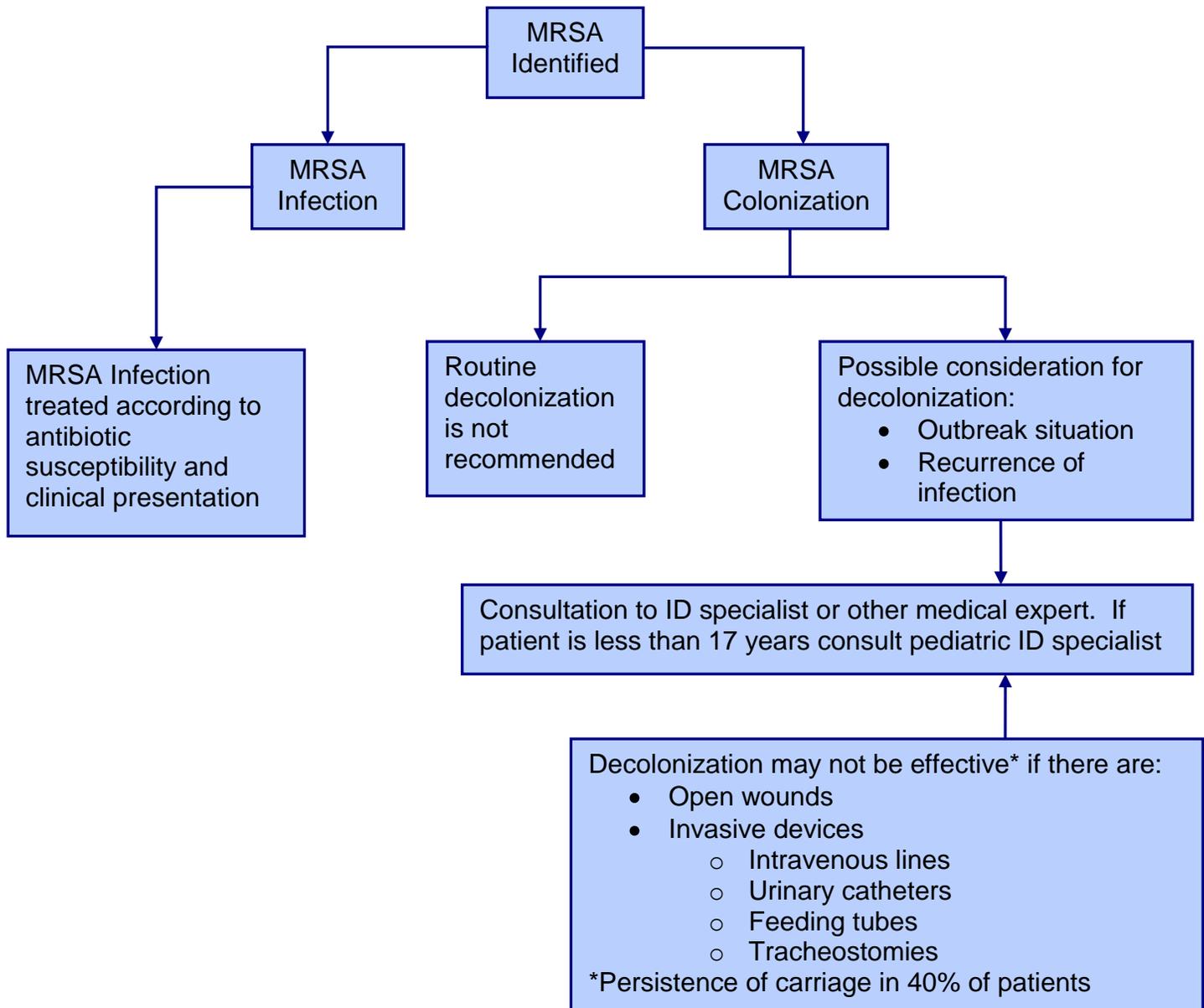
ICP signature \_\_\_\_\_

Date \_\_\_\_\_

## Appendix C

### MRSA Decolonization Decision Algorithm

(Adapted from PICNET Antibiotic Resistant Organism Guidelines)



## Appendix D: Sample Investigation Protocols for MRSA and VRE in Acute Care Facilities

(Adapted from PIDAC Best Practices for Infection Prevention & Control of Resistant *Staphylococcus aureus* and *Enterococcus*)

NOTE: The following investigation protocols are provided as SAMPLES to be used as a guide when developing individualized policies in acute care facilities.

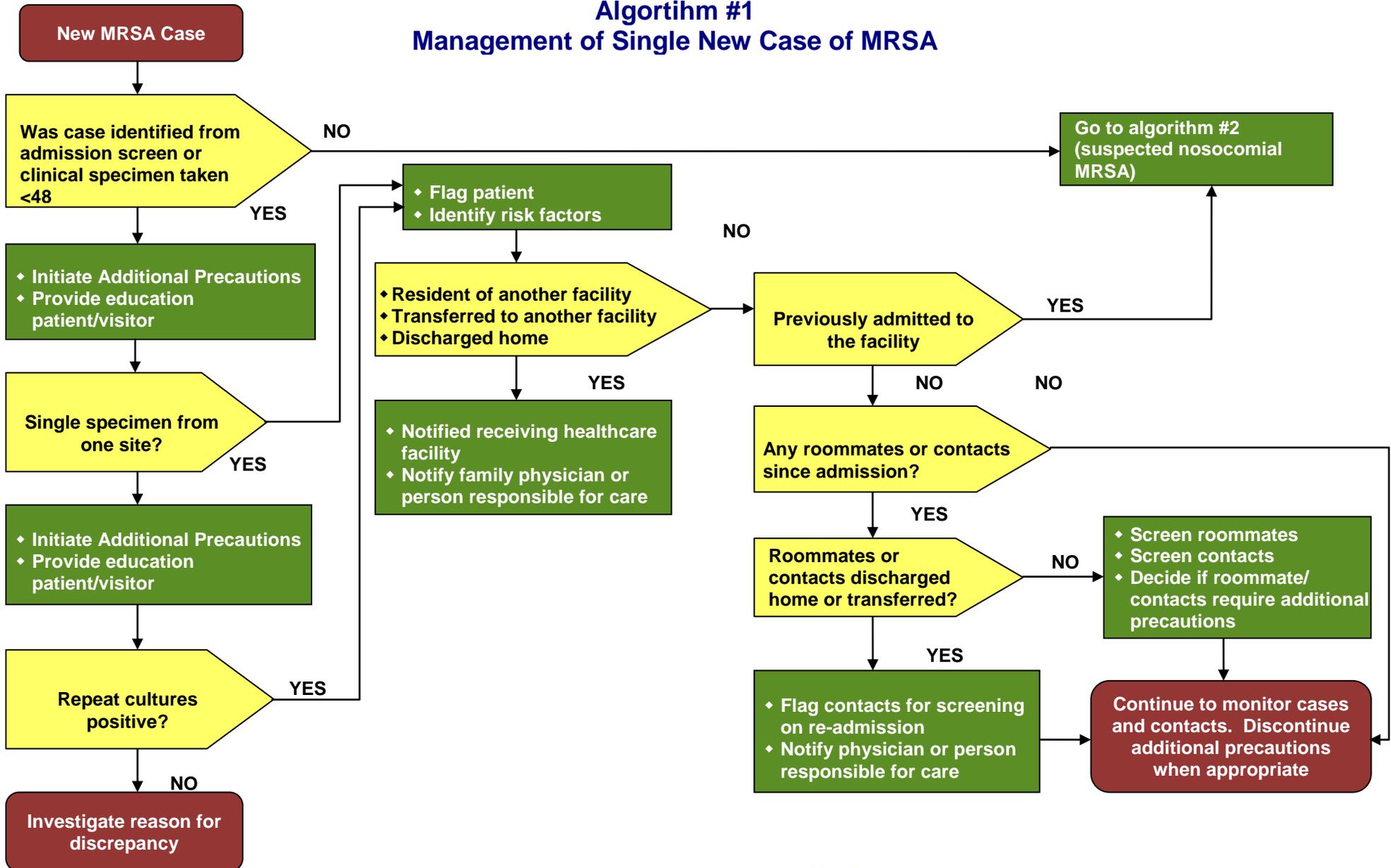
### SAMPLE 1: MRSA PRESENT AT ADMISSION

Single MRSA case identified on admission screening **OR** Clinical specimen taken within 48\* hours of admission

#### Procedure

1. Institute Contact Precautions for patient with MRSA.
2. Provide patient and visitor education.
3. If only one specimen at one site is positive in a newly identified case, re-swab the patient.
4. Flag patient.
5. Have laboratory save the isolate if this is not done routinely for first isolates.
6. Identify whether patient has risk factors for MRSA:
  - If the patient's risk factor for MRSA is a prior admission in your facility, begin an investigation based on the recognition that this may have been acquired at your facility.
7. If patient was a resident of another health care facility, or has been transferred to another facility, notify that facility of the screening results. If the patient has been discharged home, the patient or family physician should be notified of the screening results.
8. Identify any roommates or contacts that this patient has had since admission:
  - a. If roommate or contact has been discharged home or transferred to another facility, flag them for screening on readmission and notify family physician or physician most responsible for their care.
  - b. Determine if the roommate or contact requires Contact Precautions, based on your facility policies.
  - c. Screen the roommate or contact
  - d. If results of screening are positive (i.e. additional MRSA-positive patients are detected):
    - i. Flag roommate or contact.
    - ii. If roommate or contact has been transferred to another facility, notify that facility of the screening results. If roommate or contact has been discharged home, they or their family physician or the physician most responsible for their care should be notified of the screening results.
    - iii. If screening results indicate that this may be an outbreak or that there are health care-associated cases, begin an investigation.
9. Continue with case management for cases and positive contact still in facility.

### Algorithm #1 Management of Single New Case of MRSA



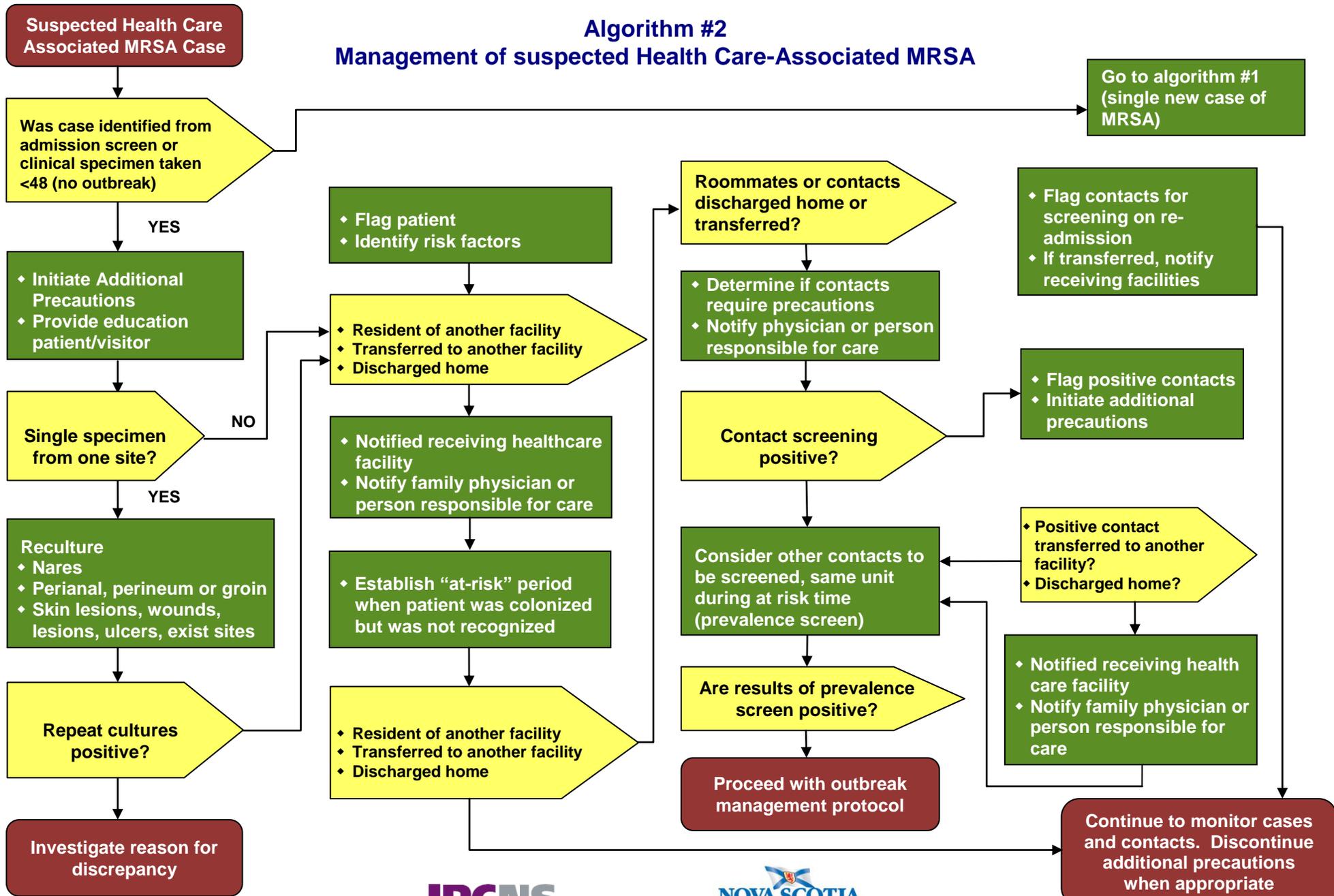
## SAMPLE 2: SUSPECTED HEALTH CARE-ASSOCIATED MRSA

Single MRSA case identified on a clinical specimen or screening specimen taken more than 48\* hours after admission, in the absence of a known outbreak

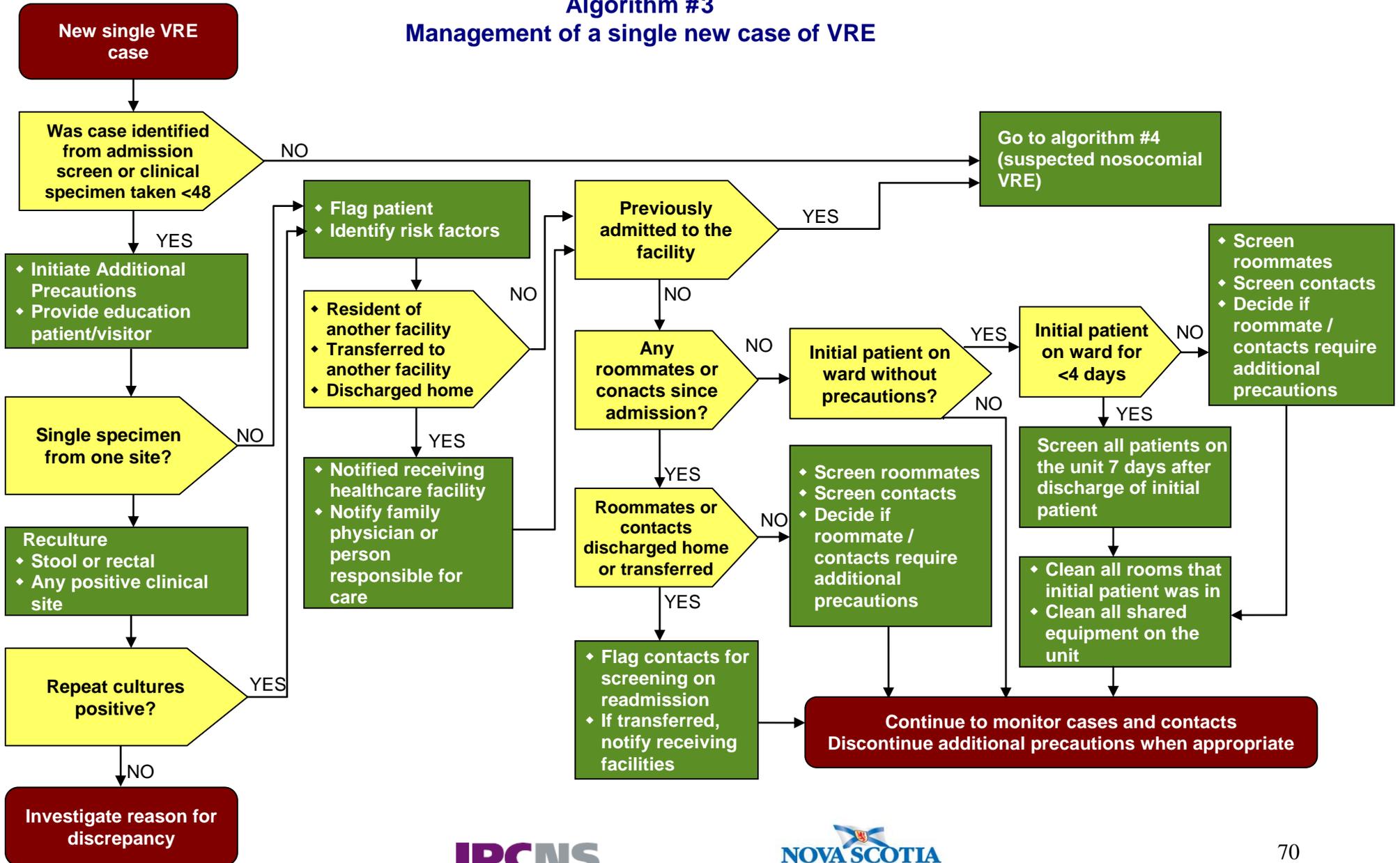
### Procedure

1. Institute Contact Precautions for patient with MRSA.
2. Provide patient and visitor education.
3. If only one specimen at one site is positive in a newly identified case, re-swab the patient.
4. Flag patient.
5. Have laboratory save the isolate if this is not done routinely for first isolates.
6. If patient has been transferred to another facility, notify that facility of the screening results. If the patient has been discharged home, the patient or family physician or physician most responsible for care should be notified of the screening results.
7. If the patient's risk factor for MRSA is a prior admission in your facility, begin an investigation based on the recognition that this may have been acquired at your facility.
8. Assess patient to attempt to identify sources for the MRSA:
  - a. Establish an "at-risk" period when the patient may have been colonized but was not recognized (e.g. during a known exposure to another positive patient).
  - b. Identify roommates or contacts that this patient has had during the 'at-risk' period:
    - i. Based on their degree of exposure, determine if Contact Precautions are required for roommates or contacts.
    - ii. If roommate or contact has been subsequently transferred to another facility, notify that facility about the need to screen them for MRSA.
    - iii. If roommate or contact has been discharged home or transferred to another facility, flag them for screening on readmission.
    - iv. Screen the identified roommates and/or contacts that remain in your facility
    - v. If results of screening are positive (i.e. additional MRSA-positive patients are detected):
      - Flag roommate or contact;
      - Institute Contact Precautions for roommate or contact if this has not been done;
      - If roommate or contact has been subsequently transferred to another facility, notify that facility of the screening results. If roommate or contact has been discharged home, they or their family physician or the physician most responsible for care should be notified of the screening results.
  - c. Identify other contacts who need to be screened. In particular, consider screening all patients who are on the same unit/ward, or who spent more than 3-4 days on the unit/ward during the at-risk period ("prevalence screen").
  - d. If analysis of the prevalence screen results for MRSA identifies further transmission, then additional screening should be conducted until no further transmission is detected.
  - e. Consider whether follow-up of any contacts in the community is warranted (e.g. patients who are frequently re-admitted).
9. Continue with case management for cases and positive contacts still in facility.
10. Facilities that do not have well-established infection prevention and control departments should work with organizations that have infection prevention and control expertise, such as academic health sciences centres, Regional Infection Control Networks, public health units that have professional staff certified in infection prevention and control and local infection prevention control associations (e.g. Community and Hospital Infection Control Association – Canada chapters), to develop protocols for effective follow-up of MRSA cases.

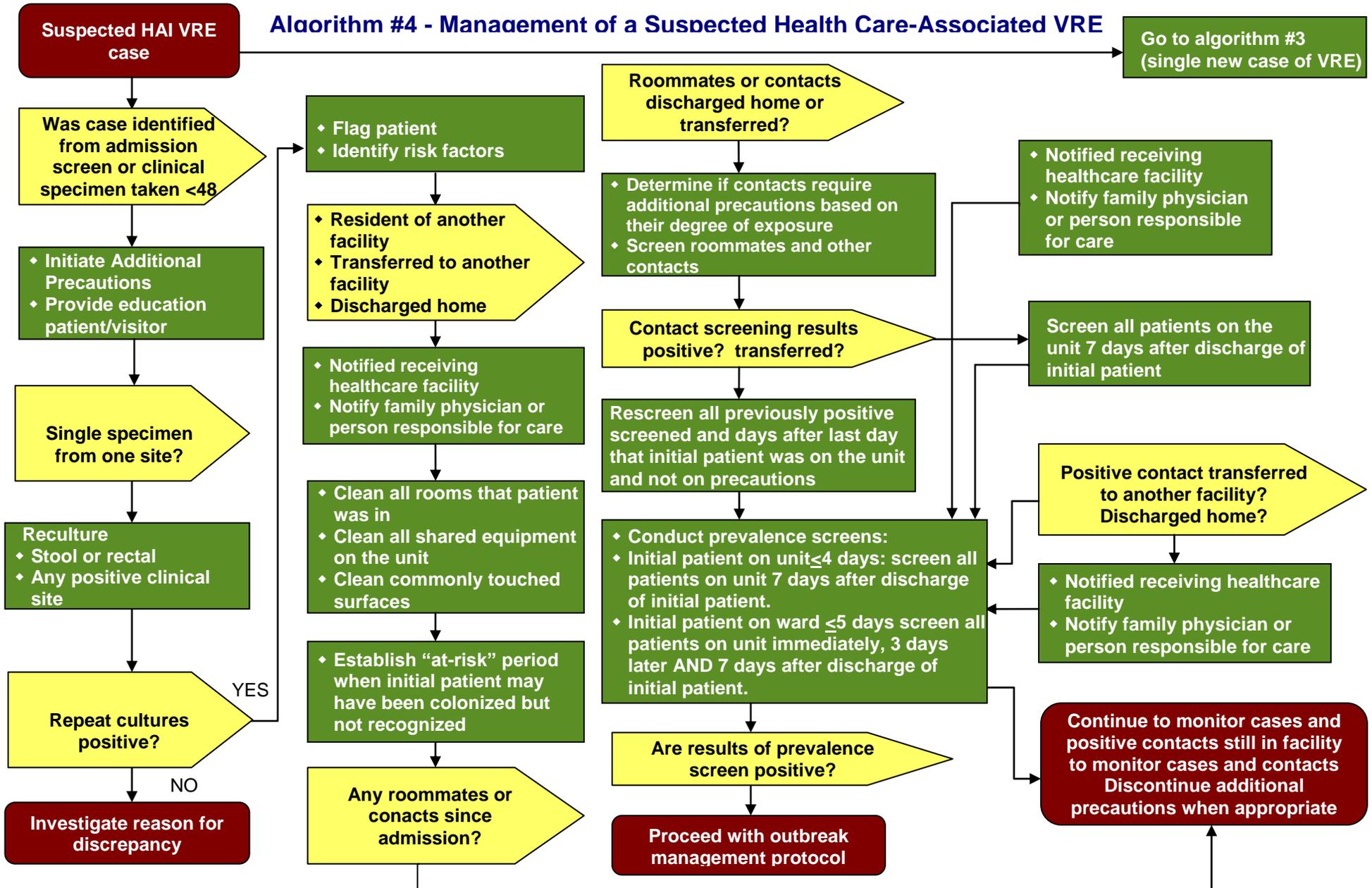
**Algorithm #2**  
**Management of suspected Health Care-Associated MRSA**



**Algorithm #3**  
**Management of a single new case of VRE**



**Algorithm #4 - Management of a Suspected Health Care-Associated VRE**



**Appendix E: Sample Risk Factor-Based Admission Form for Screening for MRSA and VRE** (Adapted from PIDAC Best Practices for Infection Prevention & Control of Resistant *Staphylococcus aureus* and *Enterococcus*)

**Antibiotic Resistant Organisms (ARO) Admission Screen** (for all patients)

Check off the appropriate risk factors below and follow orders for screening with any patient who has a risk factor for an Antibiotic Resistant Organism.

Check electronic patient chart for patient attributes of VRE or MRSA (e.g. precaution flag)

**Risk factors for Antibiotic Resistant Organisms:**

- yes  no Direct transfer from a facility outside of Canada → **If YES**, admit into a single room on Contact Precautions and reassess when culture results are known.
- yes  no Direct transfer from another hospital, nursing home, retirement home or other health care facility, including internal sites/your own facility.
- yes  no Any hospital, nursing home, retirement home or other health care facility admission (>12 hours) in the past 12 months (in Canada or outside Canada), including internal sites/your own facility
- yes  no Patient receiving home health care services or receiving dialysis
- yes  no Patient living in a communal living setting (e.g. shelter, halfway house, correctional facility)
- yes  no Patient has previously had an antibiotic resistant organism (e.g. MRSA, VRE)

**Orders for Screening Specimens:**

If the answer to any of the above risk factors is YES, or if there is any doubt about the presence of risk, then follow procedures A and B:

**A. Send specimens for MRSA from the following sites:**

- Anterior nares (both nares with one swab)
- Perianal/perineal skin or groin
- Open wounds/lesions/incisions
- Exit sites of indwelling devices

**B. Send a rectal swab or stool specimen for VRE (stool is preferred).**

Label all specimens with patient's name and site of specimen. Ensure that requisition or electronic order is completed (one per specimen).

Specimens sent:

Date:

Print Signature & Sign :

Patient refused specimens. Notify the Infection Prevention & Control Professional or delegate.

Date:

Print Signature & Sign

## Appendix F - Collecting Specimens for MRSA and VRE

Source: Health Canada/Public Health Agency of Canada (PHAC) Guidelines and Adapted from South Shore District Health Authority

- Check with your laboratory regarding appropriate specimens for detection of MRSA and VRE.
- Always use aseptic technique when collecting specimens.
  1. Moisten the swab with sterile water or sterile saline.
  2. For nares, use regular culture and sensitivity (C&S) swabs:
    - Gently insert the swab and rotate five (5) times in the anterior nare.
    - Using the same swab, repeat the process in the other nare.
  3. For incisions, lesions, and catheter sites use C&S swabs, moistened as above.
  4. Dry swabs may be used only on areas of drainage, e.g. an open wound or draining abscess.
  5. Admission screening swabs should be obtained as soon as admission is confirmed.
  6. If immediate delivery to the lab is not possible, refrigerate and deliver to lab staff as soon as possible.

## Appendix G – Steps in an Outbreak Investigation

Source: Provincial Infection Control Network – BC Antibiotic Resistant Organism Guidelines  
November 2008

- Determine likelihood that outbreak exists
- Form a multi-disciplinary outbreak management team
- Verify diagnosis
- Gather information on index case(s) in order to establish possible source
- Case Finding:
  - ~ Establish case definition, including person, time, and place
  - ~ Develop possible etiologic hypotheses, considering potential exposures
  - ~ Define population at risk (include parameters of time and place)
  - ~ Look for additional cases: establish surveillance, collect data and specimens
  - ~ Measure excess disease occurrence
  - ~ Encourage immediate reporting of new cases.
  - ~ Verify the diagnosis of reported cases
  - ~ Search for other cases by examining lab reports, medical records, patient charts, physicians and nursing staff.
  - ~ Use a data collection form – line list.
- Control Phase – Institute appropriate early control measures:
  - ~ Evaluate healthcare system factors to determine their role in MRSA transmission:
  - ~ Emphasize adherence to routine practices and other infection control precautions
  - ~ Assess staffing levels for anticipated increased demand
  - ~ Provide education for staff and other departments as necessary
  - ~ Evaluate availability of resources: hand hygiene facilities and products, equipment to dedicate to infected/colonized patients
  - ~ Review cleaning & disinfection procedures and management /storage of supplies
  - ~ Develop, implement and monitor action plans to reduce transmission
  - ~ Evaluate effectiveness of control measures, e.g. cases cease to exist or return to endemic level.

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