

Provincial Infectious
Diseases Advisory
Committee
(PIDAC)

Best Practices For Infection Prevention and Control of Resistant *Staphylococcus aureus* and Enterococci

- **Methicillin-resistant *Staphylococcus aureus* (MRSA)**
- **Vancomycin-intermediate *Staphylococcus aureus* (VISA)**
- **Vancomycin-resistant *Staphylococcus aureus* (VRSA)**
- **Vancomycin-resistant Enterococcus (VRE)**

In All Health Care Settings

Ministry of Health and Long-Term Care
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PIDAC would like to acknowledge the contribution and expertise of the subcommittee that developed this document:

Infection Prevention and Control Subcommittee

Dr. Mary Vearncombe, Chair

Medical Director, Infection Prevention and Control, Microbiology
Sunnybrook Health Sciences Centre and Women's College Hospital

Mary Lou Card

Manager, Infection Prevention and Control
London Health Sciences Centre and St. Joseph's Health Care

Dr. Maureen Cividino

Occupational Health Physician
St. Joseph's Healthcare, Hamilton

Renee Freeman

Infection Control Practitioner
Hospital for Sick Children, Toronto

Dr. Beth Henning

Medical Officer of Health
Huron County

Dr. Allison McGeer

Director, Infection Control
Mount Sinai Hospital, Toronto

Pat Piaskowski

Regional Coordinator
Northwestern Ontario Infection Control Network

Dr. Virginia Roth

Director, Infection Prevention and Control Program
The Ottawa Hospital

Dr. Dick Zoutman

Professor and Chair, Divisions of Medical Microbiology and of Infectious Diseases
Medical Director of Infection Control, South Eastern Ontario Health Sciences Centre
Queen's University, Kingston, Ontario
Co-Chair, Provincial Infectious Diseases Advisory Committee (PIDAC)

Dr. Erika Bontovics

Ex-officio member
Senior Infection Control Consultant
Public Health Division, Ministry of Health and Long-Term Care

Clare Barry

Ex-officio member
Senior Infection Prevention and Control Consultant
Strategic Planning & Implementation Branch
Public Health Division, Ministry of Health and Long-Term Care

Liz Van Horne

Ex-officio member
Infection Prevention and Control Consultant
Strategic Planning & Implementation Branch
Public Health Division, Ministry of Health and Long-Term Care

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Preamble

About This Document

This document deals with the prevention and control of methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-intermediate *Staphylococcus aureus* (VISA), vancomycin-resistant *Staphylococcus aureus* (VRSA) and vancomycin-resistant enterococci (VRE) in health care settings across the continuum of care (see below) including, but not limited to, acute care, long-term care, chronic (including mental health) care and home health care. The infection prevention and control management of health care-associated MRSA and community-associated MRSA is the same.¹

This document provides infection prevention and control practices to:

- Decrease the risk of acquisition and transmission of MRSA and VRE to clients/patients/residents and health care providers;
- Assist staff in managing clients/patients/residents colonized or infected with MRSA and VRE within health care settings and as they move from one health care setting to another;
- Assist the health care system in assessing and containing new antibiotic resistant organisms.

Evidence for Recommendations

The best practices in this document reflect the best evidence and expert opinion available at the time of writing and are graded by the quality of evidence on which the recommendation is based (refer to Appendix A for the grading system used in this document). Since there is limited scientific evidence on which to base prevention and control of MRSA and VRE, many of the recommendations are graded III (i.e. recommended by a consensus of experts). As new information becomes available, the best practices in this document will be reviewed and updated.

How and When to Use This Document

The best practices for managing MRSA and VRE set out in this document should be practiced in all settings where care is provided, across the continuum of health care. This includes settings where emergency (including pre-hospital) care is provided, hospitals, long-term care homes, mental health facilities, outpatient clinics, community health centres and clinics, physician offices, dental offices, offices of allied health professionals, Public Health and home health care.

Health care workers should also refer to Appendix G, "*PIDAC's Routine Practices Fact Sheet for Health Care Settings*" and to the Public Health Agency of Canada/Health Canada document, "*Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*,"² available online at:

<http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html>.

Assumptions and General Principles for Infection Prevention and Control

The best practices in this document are based on the assumption that health care settings in Ontario already have basic infection prevention and control systems in place. If this is not the case, health care settings will find it challenging to implement the practices recommended for the

management of MRSA and VRE. These settings must work with organizations that have infection prevention and control expertise, such as academic health science centres, regional infection control networks, public health units that have professional staff certified in infection prevention and control and local infection prevention and control associations (e.g. Community and Hospital Infection Control Association – Canada chapters), to develop evidence-based programs. (Note: requirements for a comprehensive infection prevention and control program are currently being developed; see also the chapter on infection control in “*A Plan of Action. Final Report of the Ontario Expert Panel on SARS and Infectious Disease Control, April 2004.*”³) For a list of infection prevention and control resources, refer to Appendix M, “*Resources for Infection Prevention and Control*”).

In addition to the general assumption (above) about basic infection prevention and control, these best practices are based on the following additional assumptions and principles:

1. Health care settings routinely implement best practices to prevent and control the spread of infectious diseases, including Health Canada’s “*Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*” (*Can Commun Dis Rep. 1999; 25 Suppl 4:1-142*).²
2. Health care settings devote adequate resources to infection prevention and control.
3. Health care settings have programs in place that promote good hand hygiene practices and ensure adherence to standards for hand hygiene.
4. Health care 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; and ongoing review of procedures.
5. Health care settings provide a setting that is conducive to following and maintaining Routine Practices (see below). This includes the set up and organization of the health care setting in order to provide access to hand hygiene.
6. Health care settings provide regular education (including orientation and continuing education) and support to help staff consistently implement appropriate infection prevention and control practices. 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 rubs and handwashing;
 - principles and components of Routine Practices (see below and refer to Appendix G, “*PIDAC’s Routine Practices Fact Sheet for Health Care Settings*”) 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 health care equipment, supplies and surfaces or items in the health care environment (e.g. beds, bed tables, call bells, toilets, privacy curtains);
 - individual staff responsibility for keeping clients/patients/residents, themselves and co-workers safe; and
 - collaboration between professionals involved in occupational health and safety and infection prevention and control.

NOTE: Education programs should be flexible enough to meet the diverse needs of the range of health care providers and other staff who work in the health care setting. The local public health unit and regional infection control networks may be a resource and can provide assistance in developing and providing education programs for community settings.

7. Health care settings promote collaboration between professionals involved in occupational health and safety and infection prevention and control in implementing and maintaining appropriate infection prevention and control standards that protect workers.
8. The health care setting is to be in compliance with the *Occupational Health and Safety Act*, R.S.O. 1990, c.0.1 and associated Regulations including the *Health Care and Residential Facilities – O. Reg. 67/93*.⁴
9. It is recommended that all health care settings follow the Communicable Disease Surveillance Protocols⁵ (Public Hospitals Act Reg. 965) and other legislated requirements.
10. Health care settings have effective working relationships with their local public health unit. They maintain clear lines of communication, contact public health for information and advice as required, and fulfill their obligations (under the *Health Protection and Promotion Act*, R.S.O. 1990, c.H.7) to report reportable and communicable diseases. Public health provides regular aggregate reports of outbreaks of any infectious diseases in facilities and/or in the community to all health care settings.
11. Health care settings have access to ongoing infection prevention and control advice and guidance to support staff and resolve any uncertainty about the level of precautions required in a given situation (refer to Appendix M, “Resources for Infection Prevention and Control”).
12. Health care 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 units, the MOHLTC, Health Canada and Public Health Agency of Canada websites and local regional infection prevention and control networks.
13. Health care settings report back to staff on the impact of their surveillance efforts (e.g. benefits of case finding/surveillance and preventive practices in the workplace in terms of client/patient/resident safety, client/patient/resident and staff illness and outbreaks).
14. Health care settings have a process for evaluating personal protective equipment (PPE) to ensure it meets quality standards where applicable.
15. Health care 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.
16. Health care 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 control measures such as MRSA and VRE 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 MRSA and VRE from unidentified cases. Refer to Appendix G, “PIDAC’s Routine Practices Fact Sheet for Health Care Settings”.

The terms “Routine Practices” and “Contact Precautions” are used throughout this document and refer to the following specific measures:

Routine Practices

Routine Practices is the term used by Health Canada/Public Health Agency of Canada² to describe the system of infection prevention and control practices recommended in Canada to prevent and control transmission of microorganisms in health care settings. **Consistent use of Routine Practices² with all clients/patients/residents is critical to preventing transmission of microorganisms from patient to patient and to staff.** These practices describe prevention and control strategies to be used with **all** clients/patients/residents during **all** care, and include:

- Hand hygiene with an alcohol-based hand rub or with soap and water before and after physical contact with a client/patient/resident or with a contaminated environment (refer to Appendix D, "PIDAC'S Hand Hygiene Fact Sheet for Health Care Settings");
- Additional barrier precautions to prevent health care worker contact with blood, body fluids, secretions, excretions, non-intact skin or mucous membranes (refer to Appendix G, "PIDAC's Routine Practices Fact Sheet for Health Care Settings"):
 - Wear gloves when there is a risk of hand contact with blood, body fluids, secretions, excretions, non-intact skin or mucous membranes; gloves should be used as an additional measure, not as a substitute for hand hygiene.
 - Wear a long-sleeved gown if contamination of uniform/clothing or skin is anticipated.
 - Wear a mask and eye protection or 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.
- A single room with own toileting facilities for any client/patient/resident who contaminates the environment;
- 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 Health Canada/Public Health Agency of Canada guideline, "*Handwashing, Cleaning, Disinfection and Sterilization in Health Care*" (*Can Commun Dis Rep. 1998; 24 Suppl 8:1-54*),⁶ and the Ministry of Health and Long-Term Care document, "*Best Practices For Cleaning, Disinfection and Sterilization in All Health Care Settings.*"⁷

The full description of Routine Practices to prevent and control transmission of nosocomial pathogens can be found on the Public Health Agency of Canada website: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html>.

Contact Precautions

Contact Precautions is the term used by Health Canada/Public Health Agency of Canada² to describe additional precautions to reduce the risk of transmitting infectious agents that are normally spread via contact with an infectious person. Contact Precautions are used **in addition to** Routine Practices.

NOTE: The use of a surgical mask for contact with patients colonized/infected with MRSA is controversial. There is evidence that rates of MRSA colonization are lower in staff wearing masks than in those who do not wear masks, due to the avoidance of hand-to-nose contact.⁸ Consideration may be given to using a surgical mask for contact with clients/patients/residents with MRSA to prevent staff colonization. See discussion in Section 3, "*Personal Protective Equipment,*" under Masks.

In acute care settings:

Contact Precautions for MRSA and VRE in acute care include:

- Hand hygiene as described in Routine Practices (refer to Appendix D, "PIDAC'S Hand Hygiene Fact Sheet for Health Care Settings");
- Appropriate patient placement, i.e. single room or cohorting of patients.
- Gloves for entering the patient's room or bed space;
- Long-sleeved gown for entering the patient's room or bed space;
- Hand hygiene by the patient before leaving his/her room;
- Dedicated use of equipment or adequate cleaning and disinfecting of shared equipment.

Visitor Contact Precautions for MRSA and VRE in acute care include:

- If a visitor is in contact with other patients or is providing direct patient care (see Glossary for definition of "direct care") they should wear the same personal protective equipment as health care workers;
- Visitors must receive education regarding hand hygiene and the appropriate use of PPE (refer to Appendix F, "Sample Information Sheets for Patients and Visitors");

Patients under Contact Precautions do not require personal protective equipment when leaving their room (see Section 3 under "*Patient Transfer*").

In non-acute care settings, including non-acute facilities, ambulatory settings and home health care:

Contact Precautions for MRSA and VRE in non-acute care include:

- Hand hygiene as described in Routine Practices (refer to Appendix D, "PIDAC's Hand Hygiene Fact Sheet for Health Care Settings");
- Appropriate client/patient/resident placement (e.g. single room, cohort) on a case-by-case basis, assessed by a multidisciplinary team;
- Gloves for direct care (see glossary for definition of "direct care");
- Long-sleeved gown for direct care for VRE⁹ and when clothing/skin may become contaminated (e.g. room of resident who soils the environment);
- Hand hygiene for the client/patient/resident on presentation and departure from an ambulatory/clinic setting⁹;
- Dedicated use of equipment or adequate cleaning and disinfecting of shared equipment (e.g. chair, couch). Covering the chair/couch with a disposable or washable sheet before each attendance by a VRE-colonized client/patient/resident may reduce cleaning requirements after use.

Visitor Contact Precautions for VRE and MRSA in non-acute care include:

- If a visitor is in contact with other clients/patients/residents or is providing direct care they should wear the same personal protective equipment as health care workers (see glossary for definition of "direct care");
- Visitors must receive education regarding hand hygiene and the appropriate use of PPE as described in Routine Practices.

Clients/residents under Contact Precautions do not require personal protective equipment when leaving their room (see Section 3 under "*Patient Transfer*").

The full description of Contact Precautions to prevent and control transmission of nosocomial pathogens can be found on the Public Health Agency of Canada website: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html>.

Abbreviations

ARO	Antibiotic Resistant Organism
CA-MRSA	Community-associated methicillin-resistant <i>Staphylococcus aureus</i>
HIV	Human Immunodeficiency Virus
ICP	Infection Prevention and Control Professional
ICU	Intensive Care Unit
MIC	Minimal Inhibitory Concentration
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
MSSA	Methicillin-sensitive <i>Staphylococcus aureus</i>
PHAC	Public Health Agency of Canada
PPE	Personal Protective Equipment
VISA	Vancomycin-intermediate <i>Staphylococcus aureus</i>
VRE	Vancomycin-resistant Enterococci
VRSA	Vancomycin-resistant <i>Staphylococcus aureus</i>

Glossary of Terms

Additional Precautions: These precautions (i.e. Contact Precautions, Droplet Precautions, Airborne Precautions) are carried out in addition to Routine Practices when infections caused by organisms transmitted by these routes are suspected or diagnosed. They include the physical separation of infected or colonized clients/patients/residents from other individuals and the use of barriers (e.g. gowns, gloves, masks) 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”). See *Assumptions and General Principles for Infection Prevention and Control* (above) 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 health care within a health care 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 personnel to care only for clients/patients/residents known to be colonized or infected with the same microorganism. Such personnel 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 patient will be asymptomatic.

Community-associated Methicillin-resistant *Staphylococcus aureus* (CA-MRSA)¹: 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 health care 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 patient 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: A type of Additional Precautions to reduce the risk of transmitting infectious agents via contact with an infectious person. Contact Precautions are used **in addition to** Routine Practices. See *Assumptions and General Principles for Infection Prevention and Control* (above) 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.

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 and pushing a wheelchair 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.

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 rub (when hands are not visibly soiled). Optimal strength of alcohol-based hand rubs should be 60% to 90% alcohol. Refer to Appendix D, "*PIDAC'S Hand Hygiene Fact Sheet for Health Care Settings*", for more information about hand hygiene.

Health care-associated Infection (HAI): A term relating to infections that are acquired during the delivery of health care (also known as "nosocomial infection").

Health Care Facility: A set of physical infrastructure elements supporting the delivery of health-related services. A health care facility does not include a patient's home or physician offices where health care may be provided.

Health Care Setting: Any location where health care is provided, including settings where emergency care is provided, hospitals, long-term care homes, mental health facilities, outpatient clinics, community health centres and clinics, physician offices, dental offices, offices of allied health professionals and home health care.

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 health care settings, can prevent or reduce the risk of transmission of microorganisms to health care workers, other clients/patients/residents and visitors.

Infection Prevention and Control Professional(s) (ICPs): Trained individual(s) responsible for a health care 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 from the Regional Infection Control Network or Public Health.

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.

Methicillin-resistant *Staphylococcus aureus* (MRSA): MRSA are strains of *S. aureus* that have an MIC to oxacillin of ≥ 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 *S. aureus* that have an MIC to oxacillin of ≤ 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 health care (also known as "health care-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 health care 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. patient-to-patient, patient-to-staff, staff-to-patient, 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 health care 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 focussed on efforts to prevent chronic diseases and injuries and to respond to public health emergencies and infectious disease outbreaks by working closely with provinces and territories. Some of the PHAC activities were originally part of Health Canada and some publications referred to in this document originated in Health Canada but are now under the jurisdiction of PHAC.

Reservoir: Any person, animal or environmental surface in which an infectious agent survives or multiplies, posing a risk for infection.

Routine Practices: The system of infection prevention and control practices recommended by the Public Health Agency of Canada to be used with all clients/patients/residents during all care to prevent and control transmission of microorganisms in health care settings. See “*Assumptions and General Principles for Infection Prevention and Control*” (above) 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 B for examples of screening tools).

Sentinel Event: A colonization/infection in the occurrence of 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 health care setting that will bring him/her into contact with clients/patients/residents including: all health care 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 bacterium commonly found on the skin and mucous membranes (especially anterior nares) of some individuals. *S. aureus* is the most common cause of health care-associated infections.

Terminal Cleaning: The cleaning of a client/patient/resident room or bedspace following discharge or transfer of the client/patient/resident, in order to rid it of 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 ≥ 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 of 8 to 16 mcg/ml.

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

BEST PRACTICES FOR INFECTION PREVENTION AND CONTROL OF RESISTANT *STAPHYLOCOCCUS AUREUS* AND ENTEROCOCCI IN ALL HEALTH CARE SETTINGS

I. Background

What is Staphylococcus aureus?

Staphylococcus aureus is an aerobic Gram-positive coccoid bacterium that periodically lives on the skin and mucous membranes of a large proportion of healthy adults (60% or more)¹⁰ without causing illness. These individuals are said to be “colonized” with the microorganism. Ten to twenty per cent of people are persistently colonized with *S. aureus*.¹¹ Those who are non-carriers and are never colonized with *S. aureus* are in the minority.¹⁰ Occasionally, *S. aureus* might be the cause of infections such as impetigo, carbuncles and abscesses or more invasive disease.¹² *S. aureus* is the single most common cause of hospital-associated infection.

What is MRSA?

When *S. aureus* develops reduced susceptibility to the beta lactam class of antibiotics (e.g. cloxacillin) it is known as methicillin-resistant *Staphylococcus aureus* (MRSA). While MRSA is more resistant to some treatments than methicillin-sensitive *S. aureus* (MSSA), there is little evidence to suggest that it is more pathogenic or virulent (i.e. more likely to cause infection or more severe infection) than MSSA. Infection with MRSA is associated with higher case fatality rates than MSSA.^{13,14} Most experts believe that this is because infection with MRSA may result in greater delay in the time to initiation of appropriate therapy than infection with MSSA. MRSA may be either health care-associated or community-associated (CA-MRSA).

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 patients,¹⁵ and is a common cause of health care-associated infection.

What are VRE?

Vancomycin-resistant enterococci (VRE) are strains of *Enterococcus faecium* and *Enterococcus faecalis* that have become resistant to high levels of the antibiotic 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-sensitive enterococci.^{15,16}

How are MRSA and VRE Spread?

The single most important mode of transmission of MRSA and VRE in a health care setting is via transiently colonized hands of health care workers who acquire it from contact with colonized or infected clients/patients/residents, or after handling contaminated material or equipment.^{14,17} The unrecognized colonized client/patient/resident presents a particular risk for transmission to other clients/patients/residents.

The number of colonized clients/patients/residents (“colonization pressure”) will also influence the likelihood of acquiring MRSA or VRE.¹⁸

MRSA Acquisition and Transmission

Risk factors for MRSA acquisition 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.¹⁴ MRSA might also be transmitted from mother to child via breast milk.¹⁹

MRSA is most commonly spread via the transiently colonized hands of health care workers who acquire it from 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.²⁰

Most items in the health care environment, especially those frequently touched by the hands of health care 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.^{14,20,21,22,23}
- The environment may be a factor for fomite transmission in any setting, particularly in special settings such as burn units or intensive care units.²⁰

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).²⁴ ^{14,17,25}

VRE Acquisition and Transmission

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.¹⁵

VRE is most commonly spread via the transiently colonized hands of health care workers who acquire it from contact with colonized or infected clients/patients/residents⁹, or after handling contaminated material or equipment. Hospitalized patients with gastrointestinal carriage of VRE are the major reservoir.¹⁶

VRE transmission via environmental sources includes:

- most items in the health care environment including blood pressure cuffs, electronic thermometers, monitoring devices, stethoscopes, call bells and bed rails²⁶;
- Contamination of the environment with VRE is more likely when a client/patient/resident has diarrhea.^{9,26}

The Case for Prevention and Control of MRSA and VRE

Despite the advances made in medical knowledge, infectious diseases are becoming an increasing threat to public health. Antibiotic resistance is a serious threat to the treatment of infectious diseases.²⁷ Although antibiotic resistant organisms (AROs) have existed since the use of antibiotics began, they have developed rapidly only in the last 50 years.²⁷ With the rise in MRSA and VRE has come the need for measures to prevent and control the spread of these microorganisms. Since the usual method of acquisition of MRSA and VRE infection is via direct or indirect contact, it is possible to prevent these infections by instituting a set of practices and procedures that will prevent transmission of MRSA and VRE to clients/patients/residents via unprotected contact.²⁸ Such prevention and control efforts are necessary to protect the health and improve outcomes of clients/patients/residents, but also to lessen the impact of MRSA and VRE on health care systems.

Current Status of MRSA in Canada and Ontario

Though MRSA in Canada is not a reportable disease, laboratory-based surveillance of MRSA in 38 sentinel Canadian hospitals has been carried out since 1995. From 1995 to 2004 the total incidence of MRSA (infection and colonization) increased 13-fold in these hospitals from 0.44 cases per 1000 admissions to 5.86 per 1000 admissions,²⁹ with most of the increase occurring in Ontario and Quebec. Overall, in 2005, in Canadian hospitals, 11.2% of *S. aureus* isolates are MRSA.³⁰

In Ontario there were 11,468 patients identified with MRSA colonization or infection in 2005, an increase of 11% over 2004.^{31,32} Twenty-nine percent of the patients in 2005 who acquired MRSA had a clinically symptomatic infection due to the MRSA. Of the 55% of patients whose site of acquisition was known, 72% had hospital-acquired MRSA, 15% had acquired MRSA in a nursing home and 13% were thought to have acquired MRSA in the community.³² The number of reported bacteremias due to MRSA in 2005 was 367, an increase over the 2004 number of 254.³² Overall, 12.7% of *S. aureus* isolates from blood cultures were MRSA, up from 11% in 2004.

Current Status of VRE in Canada and Ontario

Results from the passive reporting network for VRE in Canada show that VRE rates are remaining low, with 0.3 cases of VRE per 1000 admissions (colonization and infection) in 1998 increasing to only 0.6 cases per 1000 admissions in 2004.²⁹ VRE represents 2.2% of enterococcal isolates in Canada.³⁰

In Ontario, the incidence of VRE more than doubled in 2005. There were 2161 patients reported as colonized in 2005, an increase from 1051 in 2004.³² The majority of patients were thought to have acquired VRE in acute-care hospitals (90%), 2% were thought to have acquired VRE in nursing homes and 8% acquired VRE in the community.³²

Rationale for Best Practices: A Call to Action

It is evident from these figures that Ontario has not yet succeeded in controlling the spread of MRSA or VRE.^{29,31} Many countries have taken different approaches to reducing the spread of MRSA and VRE and have used prevention and control measures with varying degrees of success.³³ Countries that have had success in reducing the transmission of MRSA and VRE have done so by utilizing very strict and clear sets of protocols,^{33,34} . It is imperative that prevention and control best practices be clearly outlined so that health care facilities can utilize such a framework in their MRSA and VRE prevention efforts.

In acute care, MRSA and VRE infection and colonization impact on patient outcomes, quality of care and duration of hospitalization:

- Patients infected with MRSA have been shown to have a higher incidence of mortality, particularly those with MRSA bacteremia.^{35,36,37}
- The use of Contact Precautions to manage MRSA and VRE impacts on a patient's quality of care and quality of life, with patients expressing greater dissatisfaction with treatment and receiving less documented care.³⁸
- The duration of stay in hospital for patients with MRSA and VRE is often longer than those without MRSA and VRE.^{37,39,40}

Increasing numbers of clients/patients/residents with MRSA and VRE can add to the burden of health care costs.³⁷ This increased cost of care for these clients/patients/residents places considerable economic burden on the Canadian health care system. It is estimated that the cost of MRSA in Canada ranges from \$41.7 million to \$58.7 million (in 1998 dollars).⁴⁰ Managing a patient with MRSA infection is estimated to cost between \$16, 836 and \$35, 000 (2004 dollars),

whereas the costs associated with managing a patient with MRSA colonization is at least \$1, 634 (2004 dollars).^{40,41} Costs would be considerably greater in the event of an MRSA or VRE outbreak. MRSA bacteremia has also been shown to be associated with higher hospital costs compared to MSSA bacteremia.⁴²

Even in settings where MRSA has become endemic, control measures have been found to be cost-effective.^{43,44,45,46} The use of these Best Practices to prevent transmission of MRSA and VRE will not only protect patients from the morbidity and mortality associated with MRSA and VRE infection and colonization, but will also reduce associated costs to the health care system.

II. Best Practices

1. ***Programs for the Prevention and Control of MRSA and VRE***

There is ample evidence today to show that rates of transmission of MRSA and VRE are directly related to infection prevention and control practices in health care settings. Interventions focusing on preventing cross-transmission are likely to have a greater relative impact in controlling MRSA and VRE compared with other control measures.^{43,44,45,46} An infection prevention and control program that emphasizes early identification of colonized patients through active surveillance cultures and the use of Additional Precautions for preventing transmission reduces the prevalence and incidence of both colonization and infection, improves patient outcomes, and reduces health care costs.⁴⁶

Recommendations

1.1 *Each health care setting should have a prevention and control program for MRSA and VRE.* [All]

The care requirements for patients colonized with MRSA and/or VRE can be met in all health care settings in Ontario. As with care for patients with disabilities or cognitive deficits, care for patients with MRSA and VRE may require some individualized assessment and appropriate resource allocation.

1.2 *Patients should receive health care based on their overall care needs, despite colonization with MRSA and/or VRE.* [BII]

All health care settings in Ontario must be able to manage patients who are colonized with MRSA and/or VRE.

1.3 *It should be recognized that prevention and control programs for MRSA and VRE have the potential to negatively impact on the frequency of preventable adverse events and patient satisfaction, therefore programs should include components that identify and remedy decreases in the quality of patient care resulting from the implementation of Additional Precautions.*³⁸ [BII]

2. ***Screening for MRSA and VRE***

Screening is conducted to identify colonized and infected patients. Screening is not a control method in itself and Routine Practices must be carried out on all clients/patients/residents at all times whether or not screening is conducted; however, identifying infected or colonized clients/patients/residents is necessary in order to apply further control measures such as placement and Contact Precautions. Several studies have shown that up to 50% of MRSA cases in hospital may be identified through admission screening.^{47,48} In countries where MRSA is well-controlled, active screening is an integral part of their approach.^{33,49}

Most guidelines suggest active screening of high-risk clients/patients/residents, but differ in their definition of "high-risk"^{34,46,50} and there is no compelling evidence as to clients/patients/residents should be screened. Though some studies indicate that

universal screening may be cost-effective,⁴⁵ other evidence suggests that targeted screening has similar sensitivity to universal screening⁵¹ and that it may be an effective strategy when combined with other control measures, particularly in non-ICU settings.^{48,52,53,54,55} The following screening recommendations are based on evidence related to risk factors that might put certain clients/patients/residents at increased risk.

Patients at Increased Risk for Acquiring MRSA and VRE

Increased risk for acquiring MRSA and VRE is related to both the individual client/patient/resident's own host risk factors as well as to the amount of time that is spent in a setting where they are exposed to MRSA or VRE. Both of these factors must be taken into consideration in order to assess an individual's acquisition risk.

Host risk factors are those conditions that put an individual at higher risk of acquiring an infection due to immune system compromise. They include clinical conditions such as HIV, transplant recipients and burn victims, as well as treatments that bypass the immune system, such as the use of indwelling medical devices. Exposure to certain classes of antibiotics also puts individuals at increased risk.

Some environments have been shown to be more conducive than others to acquisition of MRSA and VRE. These include in-hospital areas such as intensive care units, burn units and units that have had recent MRSA or VRE outbreaks, as well as external environments such as health care settings outside Canada, communal settings and facilities where MRSA or VRE have become endemic.

Once an individual's risk of acquiring MRSA or VRE has been assessed, decisions may be made regarding screening. Ongoing monitoring of local epidemiology and results of previous screening will determine whether modifications to screening protocols are required.

Recommendations

2.1 *Screening for risk factors for MRSA and VRE should include a screening tool that is applied to all clients/patients/residents admitted to the health care facility.* [All]

- a) The following clients/patients/residents are at increased risk for both MRSA and VRE and should be screened for MRSA and VRE:
 - i) those who have previously been colonized or infected with MRSA or VRE^{15,56};
 - ii) those who have spent time in a health care facility outside of Canada in the last 12 months;
 - iii) those who have been admitted to, or who have spent more than 12 continuous hours as a client/patient/resident in, any health care facility in the past 12 months^{45,57};
 - iv) those transferred between health care facilities (e.g. between hospitals or between a long-term care facility and a hospital)⁵⁸;
 - v) clients/patients/residents who have recently been exposed to a unit/area of a health care facility with an MRSA or VRE outbreak;
 - vi) other high-risk client/patient/resident populations as identified by the Infection Prevention and Control Professional(s), Public Health or the Regional Infection Control Network.
- b) Based on local epidemiology and risk factors, additional individuals may be considered for:
MRSA screening specimens:
 - i) those receiving home health care services in the past year;

- ii) those receiving treatment with an indwelling medical device^{59,60,61};
- iii) those receiving care in intensive care units, transplant units, burn units^{25,55};
- iv) those living in a communal setting (e.g. shelter, halfway home, correctional facility⁶²);
- v) those with a history of injection drug use^{63,64};
- vi) those who are household contacts of people with MRSA;
- vii) those who are immunocompromised^{65,66};
- viii) individuals from populations where community-associated MRSA is known to be a problem (e.g. organized sports teams).^{67,68,69}

VRE screening specimens:

- ix) those who have been recently exposed to second- and third-generation cephalosporins.^{70,71,72}
- c) Monitor changes in the local epidemiology and local risk factors for MRSA and VRE and adjust screening accordingly.

2.2 *Regulated health professionals in health care facilities are expected to take screening specimens from clients/patients/residents at increased risk for MRSA and VRE on admission as part of an MRSA and VRE prevention and control program.*^{49,51,52,53,54,55,73} [AII]

See Section 2.1 for risk factors for MRSA and VRE. If a client/patient/resident has any of these risk factors, screening specimens should be taken.

2.3 *Whenever a single positive specimen from a single site is identified in a new case, consideration should be given to confirming with a repeat specimen.* [BIII]

- a) Mislabelling of specimens may have occurred at the unit/ward level.
- b) Error can occur at both the pre-analytical and post-analytical stages of laboratory processing.
- c) Discrepant results may indicate a false-positive. If results of both sets of specimens do not concur, an investigation must be performed to identify the reasons for the discrepancy.

2.4 *Every effort should be made to try to determine the source of new cases of MRSA or VRE. Every new case should warrant an investigation.* [AIII]

Refer to Appendix I, "Sample Investigation Protocol for MRSA and VRE in Acute Care Facilities."

2.5 *All affected health care settings should be notified following the identification of a new case of MRSA or VRE or identification of a new contact of a case.* [AIII]

- a) If a client/patient/resident is identified with MRSA or VRE at admission and has been transferred from another health care setting, that health care setting should be notified of the results.
- b) If a client/patient/resident is identified with MRSA or VRE following transfer to another health care setting, the receiving health care setting should be notified of the results.
- c) If a client/patient/resident is identified with MRSA or VRE following discharge home, the client/patient/resident or family physician should be notified of the results.
- d) If a contact of a client/patient/resident with MRSA or VRE is identified as being a contact following transfer to another health care setting or discharged home, the receiving health care setting, family physician or physician most responsible for their care should be notified of the contact in order to make decisions regarding additional follow-up (refer to Appendix B, "Collecting Specimens for MRSA and VRE" and Appendix L, "Sample Letters for Physicians").

2.6 Any client/patient/resident who is considered to be an MRSA or VRE contact is to have at least one set of screening specimens taken. If initial specimens are negative it is prudent to repeat them. [BIII]

- a) A contact is a client/patient/resident who has been a roommate or been in physical contact with an unidentified client/patient/resident subsequently found to have MRSA or VRE (i.e. once MRSA or VRE are identified in a client/patient/resident, all previous roommates become new contacts).
- b) Follow-up specimens with at least two specimens taken on different days, with one taken a minimum of seven days following the last exposure, will increase the yield of MRSA or VRE and hence the accuracy of the cultures.^{47,74,75}
- c) Refer to Appendix I for a sample investigation protocol that may be used following identification of MRSA or VRE in your facility.

2.7 During an outbreak, all client/patient/resident contacts with common risk factors should be actively screened. [BIII]

In an outbreak, a contact is a client/patient/resident who has common risk factors to cases (e.g. same unit, same procedure, same staff). See Section 3 under “*Outbreak Control*” for more details. Client/patient/resident contacts should be screened when transmission of MRSA or VRE continues to occur despite active control measures.³⁴

2.8 Consideration should be given to conducting point prevalence screens on units/areas where clients/patients/residents are at high risk for acquiring MRSA or VRE during their stay in the health care setting.^{46,50,54} [BIII]

- a) A point prevalence screen is the collection of specimens on all clients/patients/residents at a single point in time, to determine the total number of cases of a particular microorganism.
- b) Clients/patients/residents at high risk include those on burn units or other high-risk units such as intensive care units, transplantation units, or other units as defined by the Infection Prevention and Control Professional(s).
- c) Refer to Appendix I for guidance in conducting prevalence screens.

2.9 Point prevalence screens should be conducted in any area where MRSA or VRE transmission is occurring. If analysis of the prevalence screen results for MRSA or VRE identifies further transmission, then additional screening should be conducted until no further transmission is detected.^{46,50} [BIII]

Refer to Appendix I for guidance in conducting prevalence screens.

Collection and Timing of Specimens for MRSA and VRE

Specimens from the anterior nares result in the highest yield of MRSA⁷⁶, with some studies indicating a sensitivity of over 90%.⁷⁷ However, for children and youth, throat swabs may have greater sensitivity than nasal swabs alone for detecting MRSA.^{78,79} MRSA has been cultured exclusively from the perianal/perineal area in some patients (2% -19% in various studies)^{47,77,80,81} as well as the groin⁸² and such specimens are also recommended. If community-associated MRSA (CA-MRSA) is suspected, cultures of recurrent furuncles, abscesses or other skin lesions should be considered in addition to the sites noted above.¹

MRSA may not be identified in some clients/patients/residents when they are colonized at a level that is too low to be detected by culture. In these clients/patients/residents, MRSA

will not be detected until the microbial population has increased over a period of time. One study found that MRSA acquired from a roommate was not detectable until 9-10 weeks following the exposure.⁷⁴ This study recommended that post-exposure screening specimens should be taken once every 4 weeks up to 6 months post-exposure. Molecular testing methods, such as polymerase chain reaction (PCR), may be more sensitive and may detect lower levels of colonization.^{83,84} The turnaround time for PCR testing is significantly shorter than traditional culture methods, particularly for VRE.

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

Refer to Appendix B for instruction in taking specimens for MRSA and VRE.

Recommendations:

2.10 Specimens for detection of MRSA should include^{46,47,76,77,81,82,83,84}: [All]

- a) **a swab from the anterior nares; AND**
- b) **a swab from the perianal area*; AND**
- c) **a swab from skin lesions, wounds, incisions, ulcers and exit sites of indwelling devices, if present, using aseptic technique where indicated.**
- d) **For newborn infants, a swab from the umbilicus should also be taken.**⁸⁵

* a perineal or groin swab is also acceptable

2.11 Specimens for detection of VRE must include stool or a swab from the rectum or anus. Stool specimens are preferred as they provide a higher yield.^{46,86} [All]

If a client/patient/resident has a colostomy, the specimen for VRE should be taken from this site.

3. Prevention and Control Measures For MRSA and VRE

Hand Hygiene

According to the principles of Routine Practices, hand hygiene must be practiced before and after all client/patient/resident contact.^{2,6,87} Refer to Appendix D, "PIDAC'S Hand Hygiene Fact Sheet for Health Care Settings", for hand hygiene methods and information.

Hand hygiene is the most important measure for controlling transmission of MRSA and VRE,⁶ with evidence suggesting that even modest increases in hand hygiene may decrease MRSA prevalence.^{88,89} Recently there has been an increase in the use of alcohol-based hand rub in health care settings, as it takes less time than traditional handwashing and has been shown to be as effective as washing with soap and water when hands are not visibly soiled.^{90,91}

Recommendations

- 3.1 Hand hygiene must be performed by all staff before and after each contact with a client/patient/resident or contact with environmental surfaces near the client/patient/resident.**^{6,87} [All]
- a) Hands must be cleaned with alcohol-based hand rub or soap and water:
 - i) before and after each contact with a client/patient/resident;
 - ii) before performing invasive procedures;
 - iii) before preparing, handling, serving or eating food;
 - iv) after care involving the body fluids of a patient and before moving to another activity;
 - v) before putting on and after taking off gloves and other PPE;
 - vi) after personal body functions, such as using the toilet or blowing one's nose;
 - vii) after contact with items in the client/patient/resident's environment.
 - b) If soap and water is used, wet hands with water, apply product to hands and rub hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers. Rinse hands with water and dry thoroughly.⁸⁷
 - c) If alcohol-based hand rub is used, apply product to the palm of one hand and rub hands together, covering all surfaces of the hands and fingers, until hands are **dry** (15 to 20 seconds).⁹² Follow the manufacturer's recommendations regarding the volume of product to use.⁸⁷
- 3.2 Clients/patients/residents should be encouraged and assisted in performing hand hygiene before leaving their room.** [All]
- Patients' hands have been shown to be a frequent site of contamination with VRE⁹ and MRSA.
- 3.3 If hands are not visibly contaminated then the use of an alcohol-based hand rub is preferred.**^{6,87,91,91} [A]
- 3.4 Washing hands with soap and water is required if there is visible soiling with dirt, blood, body fluids or other body substances.**^{6,87,90} [All]
- 3.5 In ambulatory/clinic settings, hand hygiene facilities must be available and clients should be encouraged to perform hand hygiene upon arrival and before leaving.**⁹ [All]

Patients' hands have been shown to be a frequent site of contamination with VRE⁹ and MRSA.

Additional Precautions for MRSA and VRE

Additional Precautions are required for MRSA and VRE. **In addition**, certain Routine Practices must be emphasized. These routine practices and additional precautions include:

- Contact Precautions (as outlined in "Assumptions and General Principles for Infection Prevention and Control," above);
- Decisions regarding client/patient/resident placement and movement;
- Safe management of equipment and the environment;
- Appropriate additional Personal Protective Equipment (PPE); PPE may vary according to microorganism and setting;
- Effective communication to appropriate departments and other facilities;
- Education for staff, clients/patients/residents and family.

Initiation of Additional Precautions

In addition to Routine Practices, Additional Precautions are necessary to prevent and control MRSA and VRE. Additional Precautions must 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 or VRE, it is important to institute these Additional Precautions immediately. Health care providers must report clients/patients/residents who have MRSA or VRE to the Infection Prevention and Control Professional in their health care setting.

In some infection prevention and control programs, Additional Precautions are instituted before screening, for patients believed to be at particularly high risk of being colonized or infected with MRSA and/or VRE. These patients have included: patients with a recent history of hospitalization in countries with high endemic rates of MRSA and VRE; roommates of patients newly identified as being colonized/infected with MRSA or VRE; and other exposed patients (e.g. on same ward, cared for by same health care worker). 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 patient risk factors and the amount of transmission that has occurred on the particular unit in the past), and the risk of illness in adjacent patients if transmission should occur (e.g. bone marrow transplant patients are at higher risk than elective short stay surgical patients). The risks of transmitting MRSA or VRE must also be balanced against the risks of placing such patients on Additional Precautions.

Recommendations

- 3.6** *Each health care setting should have policies in place that identify clients/patients/residents who are at the highest risk for colonization with MRSA or VRE, so that they may be placed on Contact Precautions until the results of screening tests are available.*^{33,34} [CIII]

See Section 2 for discussion about risk factors for MRSA and VRE. Examples of highest risk patients include:

- a) those who have previously been colonized or infected with MRSA or VRE;
- b) those who have spent time in a health care setting outside of Canada in the last 12 months;
- c) clients/patients/residents who have recently been exposed to a unit/area of a health care setting with an outbreak of MRSA or VRE.

- 3.7** *Each health care setting should have a policy authorizing any nurse and/or Infection Prevention and Control Professional to initiate the appropriate Additional Precautions and maintain precautions until results are confirmed.* [CIII]

- a) The person designated as the Infection Prevention and Control Professional for the health care setting is to be informed when Additional Precautions are initiated.
- b) The person designated as the Infection Prevention and Control Professional for the health care setting will verify that the precautions are appropriate to the situation.

Patient Placement

Most studies regarding accommodation of clients/patients/residents with MRSA or VRE have major limitations. Three systematic reviews of Additional Precautions for MRSA have been conducted and all concluded that there is no evidence to show that these precautions alone are effective in controlling MRSA.^{73,93,94} However, the larger of the systematic reviews, found that separating patients with MRSA from the rest of the patient population as part of their control strategy, along with other control measures, had a greater impact on controlling and decreasing MRSA rates.⁷³

Recommendations

- 3.8** *It is strongly recommended that clients/patients/residents known to be colonized or infected with MRSA or VRE be placed in a single room with individual toileting facilities.*⁴⁶ [BIII] *In acute care settings, MRSA-positive or VRE-positive patients should not share rooms with MRSA-negative or VRE-negative patients.*
- 3.9** *When single rooms for Contact Precautions are limited, priority should be given to clients/patients/residents who are at increased risk of disseminating microorganisms into the environment.* [CIII]
- a) MRSA clients/patients/residents at increased risk of dissemination of MRSA include:
 - i) Individuals with colonized tracheostomy and uncontrolled respiratory secretions;
 - ii) Individuals with respiratory infections;
 - iii) Individuals with wound or stoma drainage that is not contained by a dressing or appliance;
 - iv) Individuals with desquamating skin conditions (e.g. psoriasis, burn patients);
 - v) Individuals who are cognitively impaired.
 - b) VRE clients/patients/residents at increased risk of dissemination of VRE include:
 - i) Individuals who are at a high risk of soiling their environment (e.g. diarrhea, faecal incontinence).⁹
- 3.10** *If a single room is not available, clients/patients/residents known to be colonized or infected with MRSA or VRE may be cohorted with other clients/patients/residents after consultation with the Infection Prevention and Control Professional.* [CIII]

The following order of preference for cohorting must be used:

- a) Clients/patients/residents with MRSA should be cohorted with other clients/patients/residents with MRSA, and clients/patients/residents with VRE should be cohorted with other clients/patients/residents with VRE. [BIII]
- b) In non-acute care, if clients/residents cannot be cohorted they may, based on a case by case review, be placed with low-risk roommates.
- c) In non-acute care, MRSA clients/residents should not share a room with:
 - i) Individuals who have open wounds or decubitus ulcers;
 - ii) Individuals who have urinary catheters, feeding tubes or other invasive devices;
 - iii) Individuals whose hygiene is compromised;
 - iv) Individuals who have debilitating or bed-bound conditions that require extensive "hands-on" care.

If clients/patients/residents with MRSA are cohorted with clients/patients/residents who do not have MRSA, there should be increased attention to effective environmental cleaning throughout the duration of the cohort.²⁰

- 3.11 **Signage indicating the required Contact Precautions should be posted at the entrance to the client/patient/resident's room. Signage should maintain privacy by indicating only the precautions that are required, not information regarding the client/patient/resident's condition.** [CIII]

Refer to Appendix H, "Sample Signage for Entrance to Room of a Patient with MRSA or VRE" and to Health Canada's "Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care"² for sample signage (available online at: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html>).

- 3.12 **Clients/patients/residents and visitors must be informed about the reason for implementing Additional Precautions and be educated in the proper use of hand hygiene and Contact Precautions.** [CIII]

Personal Protective Equipment (PPE)

Gloves

Gloves have been shown to decrease hand contamination and transmission of health care-associated pathogens.^{46,95} However, since hand contamination may still occur due to leaks in the gloves or improper removal, the use of gloves cannot be considered to be a substitute for hand hygiene. Hand hygiene must be performed after glove removal.^{95,96}

Gowns

Many studies include gowning as part of Contact Precautions for preventing transmission of MRSA^{52,54} and contamination of health care workers' clothing.⁹⁷ A recent study found that the use of long-sleeved gowns by staff and visitors was protective against acquiring VRE in an intensive care unit⁹⁸ and in another study gown and glove use was found to reduce client/patient/resident acquisition of VRE compared to glove use alone.⁹⁹ VRE has been isolated from the gowns of staff after routine physical examination of a client/patient/resident¹⁰⁰ and has also been shown to contaminate health care workers' gowns in 4%-20% of outpatient consultation and radiology sessions and in 30% of hemodialysis sessions.⁹

Masks

The use of a surgical mask for contact with patients colonized/infected with MRSA is controversial. There is evidence from one study⁸ that rates of MRSA colonization are lower in staff wearing masks than in those who do not wear masks, due to the avoidance of hand-to-nose contact. In acute care settings, consideration may be given to using a surgical mask for contact with patients with MRSA to prevent staff colonization.

Removal of PPE

The process of personal protective equipment removal requires adherence to the following process to prevent recontamination:

- Remove gloves and discard using a glove-to-glove/skin-to-skin technique.
- Remove gown. Discard in linen hamper in a manner that minimizes air disturbance.
- Perform hand hygiene.
- Remove mask, if used, and discard.
- Perform hand hygiene.

Recommendations for Acute Care

- 3.13 ***In acute care settings, gloves must be worn when entering the room or bed space of any patient who has, or is suspected of having, infection or colonization with MRSA or VRE.***^{46,95} [AII]
- 3.14 ***In acute care settings, a long-sleeved gown should be worn when entering the room or bed space of any patient who has, or is suspected of having, infection or colonization with MRSA*** [BIII] ***or VRE*** [BII].
- 3.15 ***In acute care settings, consideration may be given to wearing a surgical mask as part of the precautions when entering the room of a patient colonized or infected with MRSA, to decrease nasal acquisition by health care workers.***^{8,25,34,46} [BII]
- Masks are to be worn according to Routine Practices. For more information about Routine Practices, see “Assumptions and General Principles for Infection Prevention and Control,” above.
 - If a mask is worn, one must consider that this might impinge on the quality of life of some patients due to factors such as difficulties in communication and fears or misconceptions incurred by the patient.
 - A mask is **not required** for contact with patients who have VRE.
- 3.16 ***In acute care settings, gloves and long-sleeved gown (and mask, if worn) must be removed, discarded and hand hygiene performed immediately on leaving the room or bed space of a patient who has, or is suspected of having, infection or colonization with MRSA or VRE.***^{2,96,96} [AII]

Recommendations for Non-acute Care

- 3.17 ***In non-acute care settings, Contact Precautions may need to be adapted so that clients/residents can take part in therapeutic and social activities while limiting physical contact, and there should be emphasis on staff and client/resident hand hygiene.***⁴⁶ [BIII]
- 3.18 ***In non-acute care settings, gloves must be worn when providing direct care to any client/resident who has, or is suspected of having, infection or colonization with MRSA or VRE.*** [CIII]
- 3.19 ***In non-acute care settings, a long-sleeved gown should be worn when providing direct care to any client/resident who has, or is suspected of having, infection or colonization with MRSA or VRE.*** [CIII]
- Gown use may depend upon the type of interaction and need only be worn for direct care with the client/resident when clothing may become soiled.⁴⁶
- 3.20 ***In non-acute care settings, consideration may be given to wearing a surgical mask for the provision of direct care to clients/residents with MRSA, to decrease nasal acquisition by health care workers.*** [CIII]
- Masks are to be worn according to Routine Practices. For more information about Routine Practices, see “Assumptions and General Principles for Infection Prevention and Control,” above.
 - If a mask is worn one must consider that this might impinge on the quality of life of some clients/residents due to factors such as difficulties in communication and fears or misconceptions incurred by the client/resident.
 - A mask is **not required** for contact with clients/residents who have VRE.

- 3.21** *In non-acute care settings, gloves and long-sleeved gown (and mask, if worn) must be removed, discarded and hand hygiene performed immediately on leaving the room or bed space of a client/resident who has, or is suspected of having, infection or colonization with MRSA or VRE.*^{2,96,96} [All]

Environment and Equipment

Both VRE and MRSA have been isolated from various health care surfaces including door handles, hydrotherapy tubs, gowns and linens, hospital furnishings, patient charts, tourniquets, call bells, telephones, computer keyboards, faucets and medical equipment such as glucose meters, blood pressure cuffs, electronic thermometers and intravenous fluid pumps.^{14,16,22,101,102} Widespread contamination of VRE is likely to occur in the rooms of clients/patients/residents who have diarrhea⁹ and VRE may survive on surfaces for days or weeks.¹⁶ MRSA has also been found to survive on sterile packaging for months and has been isolated from dry, dust-attracting floor mops up to 56 days after their use.^{103,104} Environmental strains have been found to be the same as those strains responsible for infection,²⁰ and there is sufficient evidence to suggest that the environment can act as a reservoir for infection.^{20,105,106,107,108}

Hospital grade disinfectants are active against both MRSA and VRE^{107,109,110} and general routine cleaning and disinfection methods are adequate for dealing with MRSA. However, routine cleaning may not be adequate to remove VRE from contaminated surfaces.^{111,112} Studies have shown that surface cultures for VRE remain positive when a cloth is dipped back into 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;¹¹¹ and when surfaces are sprayed and wiped, rather than actively scrubbed.¹¹² There has also been reported success in ending an outbreak of VRE using intensive environmental disinfection with twice-daily cleaning.¹¹³

Refer to the Ontario Ministry of Health and Long-Term Care document, “*Best Practices for Cleaning, Disinfection and Sterilization in All Health Care 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).

Recommendations

- 3.22** *Dedicate equipment to a single client/patient/resident on Contact Precautions. If MRSA-positive or VRE-positive patients are cohorted, equipment may be cohorted.*^{22,26} [BIII]

Equipment within a cohort of known positive patients can be utilized by all patients in the cohort, but must be adequately cleaned and disinfected between each patient as described under Routine Practices.

- 3.23** *Health care settings should review their cleaning and disinfection methods to ensure that they are adequate for disinfection of contaminated surfaces.*^{46,114} [CIII]

Processes for cleaning and disinfection should include sufficient contact time for disinfectants, appropriate strength of cleaning and disinfectant solutions, use of damp dusting, working from clean to dirty areas and eliminating the practice of dipping a cloth back into cleaning solution after use and re-using it on another surface.

- 3.24** *As indicated in Routine Practices, rooms and dedicated equipment used for clients/patients/residents with MRSA must be thoroughly cleaned and then disinfected using a hospital-grade disinfectant upon discharge of the client/patient/resident.*^{105,111,115,116} [BIII]
- General routine cleaning and disinfection practices, that follow the manufacturer's guidelines for contact time of the disinfecting product being used, are adequate for equipment and surfaces contaminated with MRSA.⁴⁶
 - Attention must be given to high touch surfaces such as bed rails, sinks, chairs, call bells, telephones, intravenous lines and poles, blood pressure cuffs, door handles, wall panel controls, thermostats and keyboards.
 - Consult the Infection Prevention and Control Professional if there is doubt regarding efficacy of the disinfectant being used.
 - Consideration should be given to removal and laundering of privacy curtains after discharge.
- 3.25** *Stringent protocols are required for the daily cleaning of rooms contaminated with VRE.*^{9,111} [CIII]
- Routine cleaning and disinfection may not be adequate to remove VRE from contaminated surfaces. Refer to Appendix J for a sample daily cleaning checklist for rooms contaminated with VRE.
- 3.26** *There must be a process to ensure that there has been adequate cleaning and disinfection of rooms and shared non-medical equipment contaminated with VRE following patient discharge. This may be accomplished through the use of a task checklist to ensure that all areas and surfaces are cleaned and disinfected and that post-cleaning inspection of the room has taken place.* [BIII]
- Refer to Appendix J for a sample discharge cleaning checklist for rooms contaminated with VRE.
 - In situations with persistent VRE transmission consideration may be given to post-cleaning environmental cultures to document that discharge cleaning of rooms is adequate.
- 3.27** *Routine health care cleaning practices for laundering linens are adequate for eliminating MRSA and VRE.* [A]
- All used linens must be considered to be contaminated and be handled appropriately.⁶
 - Linens must be changed upon discharge of a client/patient/resident with MRSA⁵⁰ or VRE in all healthcare settings including ambulatory care.⁹ [BIII]
- 3.28** *All curtains (privacy, window and shower) should be removed and laundered when soiled and after discharge of a client/patient/resident with VRE.* [BIII]

Patient Transfer

Intra-facility and Inter-facility Transfers

When a colonized or infected client/patient/resident is being transferred to, from, or within a health care setting, communication regarding the client/patient/resident's MRSA or VRE status is necessary (e.g. specimen test results, whether antibiotics have been used for decolonization, education given). All health care facilities in Ontario are expected to have the ability to care for clients/patients/residents who have MRSA or VRE. The MRSA or VRE status of a client/patient/resident should not affect the decision about accepting the

individual in transfer from another health care setting or department and a negative specimen is not required to transfer a client/patient/resident.

Recommendations

- 3.29** *The MRSA or VRE status of a client/patient/resident should not affect the decision about transferring the individual to any health care setting and a negative result is not required prior to the transfer.* [AIII]

See Section 1, “Programs for the Prevention and Control of MRSA and VRE” and Section 2, “Screening for MRSA and VRE.”

- 3.30** *Before transferring a client/patient/resident with MRSA or VRE, all individuals involved in the transfer and the receiving department or health care setting should be informed about the client/patient/resident’s status so that appropriate precautions may be taken and placement may be arranged.*⁵⁰ [BIII]

- a) To facilitate placement in the receiving department, information about the client/patient/resident’s status should be provided as soon as possible.
- b) The receiving facility must be notified about cultures that subsequently become positive (see Section 2.5).

- 3.31** *In acute care settings, staff should wear gloves and a long-sleeved gown if they will have physical contact during transport of a patient colonized or infected with MRSA.* [BIII]

- a) See Sections 3-13 to 3-16 above, “Personal Protective Equipment,” for details.
- b) Refer to [Appendix K](#) for a sample protocol for patient transport.

- 3.32** *In non-acute care settings, staff should wear appropriate PPE if they will have physical contact (e.g. lifting) during transport of a client/resident who is colonized or infected with MRSA.* [BIII]

- a) See Sections 3-17 to 3-21 above, “Personal Protective Equipment,” for details.
- b) Refer to [Appendix K](#) for a sample protocol for patient transport.

- 3.33** *Staff must wear gloves and a long-sleeved gown if they will have direct physical contact during transport of a client/patient/resident who is colonized or infected with VRE.*⁹ [BIII]

- a) See Sections 3-13 to 3-21 above, “Personal Protective Equipment,” for details.
- b) Refer to [Appendix K](#) for a sample protocol for transport.

- 3.34** *Transport equipment and equipment or surfaces that have had direct or indirect contact with a client/patient/resident who is colonized or infected with MRSA and who undergoes a medical, surgical or diagnostic procedure in another department, must be cleaned and disinfected immediately after the client/patient/resident leaves, using a hospital-grade disinfectant.* [BIII]

See Sections 3-22 to 3-28 above, “Environment and Equipment,” for details.

- 3.35** *Transport equipment and equipment or surfaces that have had direct or indirect contact with a client/patient/resident who is colonized or infected with VRE and who undergoes a medical, surgical or diagnostic procedure in another department,*

must be cleaned and disinfected immediately after the client/patient/resident leaves, following protocols for VRE decontamination. [BIII]

- a) Refer to [Appendix J](#) for details about cleaning for VRE.
- b) Routine cleaning methods may not be adequate to remove VRE from contaminated surfaces (see Section 3.25).

Patient Mobility

The implementation of Additional Precautions may impact negatively on a patient's quality of life.^{28,117,118,119} Modification of precautions is recommended if required for medical purposes (e.g. ambulation) or on compassionate grounds.

Recommendations

3.36 In acute care settings, prior to leaving their room, patients colonized or infected with MRSA or VRE should be assessed on a case-by-case basis to determine their risk of transmission. [BIII]

- a) Patients who leave their room must be assessed to determine their risk of transmission to others. Assessment criteria include:
 - i) the patient understands and is able to comply with precautions;
 - ii) all drainage is contained;
 - iii) the patient does not have a productive cough (applicable to MRSA);
 - iv) the patient is continent of stool and urine or contained by diaper/indwelling catheter;
 - v) the patient is able to follow basic hygiene practices such as cleaning hands;
 - vi) the patient is not on an outbreak unit;
 - vii) the patient has no other disease requiring precautions (e.g. airborne infections).
- b) Normal patient care activities must be maintained despite Contact Precautions for MRSA and VRE to maintain quality of care (e.g. ambulation as part of recovery from hip surgery).
- c) Hand hygiene must be performed by the patient and accompanying staff before leaving the patient's room.
- d) Patients who can practice appropriate personal hygiene and who will not soil their environment may leave their room for short periods provided they do not have contact with other patients or staff. See Section 4, "*Education*" for information about patient and family education.
- e) It is not necessary for the patient to wear gloves, mask or a gown outside their room.
- f) Restrictions may be considered for clients/patients/residents colonized or infected with VRE:
 - i) The patient must use only his/her own assigned toileting facilities.
 - ii) The patient may be restricted from visiting common areas, such as lounges, kitchens, cafeteria/coffee shops or gift shops.
 - iii) If the patient does visit common areas, cleaning of the area following the patient's departure is required, following VRE cleaning protocols ([Refer to Appendix J](#) for sample VRE cleaning checklist).

3.37 In non-acute care settings, clients/residents colonized or infected with MRSA or VRE are not required to remain in their room. [BIII]

- a) The client/resident should be encouraged to perform hand hygiene before leaving his/her room, with assistance given if necessary.

- b) Added measures for clients/residents whose condition puts them at a higher risk for contaminating their environment (e.g. uncontained drainage, new cough, incontinence) or other clients/residents should be made on a case-by-case basis after consultation with the health care setting's Infection Prevention and Control Professional.

Staff Considerations

The risk of staff acquisition of MRSA or VRE is low and is significantly reduced if staff follow Routine Practices, perform hand hygiene and wear PPE appropriately.²⁵ Most experts believe that with adequate adherence to hand hygiene, there is no risk of staff acquisition of MRSA or VRE.

Recommendations

- 3.38** *Staff must receive education in the correct and consistent use of Routine Practices as a fundamental aspect of infection prevention and control in health care settings, with emphasis on hand hygiene and appropriate use of PPE.* [BIII]

See Section 4, "Education".

- 3.39** *Screening of staff for MRSA should be considered when an outbreak of the same strain of MRSA continues to spread despite adherence to control measures,^{50, 120} or when an individual is strongly epidemiologically linked to new acquisitions of MRSA.⁵* [BIII]

- a) Staff who are concerned about exposure to MRSA should receive assessment and counselling from their Occupational Health department or other area that will protect the confidentiality of the individual.
- b) There is no evidence to support the need to screen staff for VRE.
- c) For further information about the management of health care workers exposed to MRSA and VRE, refer to the OHA/OMA publication, "Antibiotic Resistant Organisms Surveillance Protocol for Ontario Hospitals"⁵ may be found online at: [http://www.oha.com/Client/OHA/OHA_LP4W_LND_WebStation.nsf/resources/AntibioticResistantOrganisms/\\$file/AntibioticResistantOrganisms.pdf](http://www.oha.com/Client/OHA/OHA_LP4W_LND_WebStation.nsf/resources/AntibioticResistantOrganisms/$file/AntibioticResistantOrganisms.pdf).

- 3.40** *Decolonization of staff colonized with MRSA should be done when they are epidemiologically linked to an outbreak with the same strain and adherence to Additional Precautions has failed to contain the outbreak.* [All]
- 3.41** *If staff are colonized with a strain of MRSA that is different from the outbreak strain, decolonization may be considered.* [BIII]

Visitors

Although visitors have not been implicated in the transmission of MRSA or VRE in health care facilities, all persons entering and leaving a client/patient/resident's room require instruction regarding how to enter and leave the room safely when the client/patient/resident is on Contact Precautions for MRSA or VRE. This should include demonstration in putting on and taking off PPE, hand hygiene and disposal of linen and garbage. PPE use by a visitor must be appropriate to the type of interaction they will have with the client/patient/resident.

Recommendations

- 3.42 All health care settings should have written information available for clients/patients/residents and their families that describes Contact Precautions, explaining why they are important.** [BIII]

Refer to Appendix F, "Sample Information Sheets for Patients and Visitors."

- 3.43 Visitors should receive education and training in correct hand hygiene procedures with emphasis on the importance of hand hygiene after physical contact with the client/patient/resident and on exit from the room.** [BIII]

- a) If a visitor or volunteer is using common areas (e.g. lounge, kitchen), PPE must be removed and hand hygiene must be performed before leaving the client/patient/resident's room.
- b) Refer to Appendix D, "PIDAC'S Hand Hygiene Fact Sheet for Health Care Settings."

- 3.44 In acute care, visitors must wear PPE if they will be providing direct care to a patient who is colonized or infected with MRSA or VRE, or if they will be visiting other patients after visiting a patient who is colonized or infected with MRSA or VRE.** [BIII]

- a) Visitors who see more than one patient within a health care setting on a visit, or several clients/patients/residents in multiple health care settings (e.g. Pastoral Care workers, volunteers), must wear PPE.
- b) PPE for visitors who are providing direct physical care includes gloves and a long-sleeved gown for VRE; and gloves and long-sleeved gown, with or without a mask (depending on the facility policy), for MRSA.

- 3.45 In non-acute care facilities, visitors should wear PPE according to Routine Practices if involved in providing direct care to a client/resident who is colonized or infected with MRSA or VRE.** [CIII]

For more information about Routine Practices, see "Assumptions and General Principles for Infection Prevention and Control," above.

Decolonization

Decolonization refers to the use of topical agents, such as nasal antimicrobial ointment and body wash and/or oral antibiotics, to remove resistant bacteria from a colonized individual. Decolonization has been used, along with other measures, to help control the spread of MRSA in some centres.^{49,54} However, current evidence does not recommend widespread or prolonged MRSA decolonization therapy as this may promote antibiotic resistance, long-term efficacy is poor and systematic therapy may lead to adverse events.^{66,121}

If decolonisation therapy is used, attention must be given to scrupulously cleaning the client/patient/resident's environment in order to decrease the risk of recolonization, as the environment can play a role in transmission.

Recommendations

- 3.46 Routine decolonization therapy of MRSA clients/patients/residents is not currently recommended.**^{1,46,66,121,122,123} [EII]

Decolonization therapy with topical antibiotics alone is not effective.

- 3.47 Efforts at VRE decolonization are not effective and this is not recommended.** [EI]

- 3.48 In situations where a client/patient/resident colonized with MRSA is implicated in an outbreak, decolonization may be considered in consultation with the health care setting's Infection Prevention and Control Professional.**^{46,50,66} [BIII]

Duration of Additional Precautions

There is little information addressing the issue of when a client/patient/resident is considered to be at low risk for transmission of MRSA or VRE. Most guidelines recommend a minimum of three sets of negative specimens taken at least one week apart before considering an individual to be cleared. It must be recognized that re-colonization can occur at any time.^{34,50} See Section 2.10 for guidance regarding sets of specimens for MRSA and VRE.

Recommendations

- 3.49 The health care setting should have a policy that permits discontinuation of Additional Precautions only in consultation with the Infection Prevention and Control Professional or designate.** [BIII]
- 3.50 If MRSA or VRE infection is treated with an antimicrobial to which the MRSA or VRE is sensitive, follow-up specimens should be done after discontinuation of therapy and prior to discontinuation of Additional Precautions.** [BIII]
- 3.51 If decolonization of MRSA has been attempted, the client/patient/resident may be considered to be at low risk for transmission of MRSA if there have been three sets of negative specimens taken at least one week apart.** [BIII]
- a) Refer to section 2.10 for guidance regarding specimen collection.
 - b) In the event that three sets of specimens for MRSA have been taken at least one week apart and have been found to be negative, the Infection Prevention and Control Professional (or their delegate)^{34,50} may discontinue Additional Precautions.

- 3.52 If decolonization of MRSA is not attempted, no further specimens should be taken during the current admission.** [EIII]

When decolonization is not attempted, the majority of people remain colonized with MRSA for weeks to months,⁸⁰ and should remain on Additional Precautions.

- 3.53 In acute care, if Additional Precautions have been discontinued, weekly screening for the duration of hospitalization is recommended following clearing of MRSA, since re-colonization can occur.** [BIII]
- 3.54 In non-acute care, if Additional Precautions have been discontinued, monthly screening for 6 months is recommended following clearing of MRSA.** [BIII]

- 3.55** *In community care, re-screening is not required following clearing of MRSA.* [EIII]

Re-screening should only be done on admission to a hospital or long-term care facility.

- 3.56** *Re-colonization with MRSA or VRE may occur once a client/patient/resident has been discharged from the health care system, and specimens should be repeated on each readmission.* [AII]

Information Management

Tracking clients/patients/residents who are colonized or infected with MRSA or VRE (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 readmission.¹²⁴

Recommendations

- 3.57** *The Infection Prevention and Control Professional(s) of the health care setting should have the responsibility to determine flagging and unflagging of clients/patients/residents with MRSA or VRE.* [CIII]
- 3.58** *Place a flag (e.g. electronic notification, chart sticker) on the electronic/paper chart of any client/patient/resident who is colonized or infected with MRSA or VRE and note the MRSA or VRE status in their medical record. Flags must protect the confidentiality of the client/patient/resident.* [BII]
- 3.59** *Place a flag (e.g. electronic notification, chart sticker) on the electronic/paper chart of any client/patient/resident who is considered to be a contact of MRSA or VRE but who has subsequently been discharged, to enable screening on readmission. Flags must protect the confidentiality of the client/patient/resident.* [BII]
- 3.60** *A tracking system and database of flagged clients/patients/residents should be in place to help identify them on readmission.*¹²⁴ [BII]

Role of the Laboratory

Infection Prevention and Control programs must have an established working relationship with a Microbiology laboratory. The laboratory should be adequately resourced to handle screening specimens and be able to provide timely advice regarding patients colonized or infected with MRSA or VRE.

Recommendations

- 3.61** *Laboratories should recognize that turnaround time is a critical issue in the prevention of transmission of MRSA and VRE. Infection Prevention and Control Professionals (ICPs) and their laboratories should develop reporting systems into their protocols that notify ICPs of suspected MRSA and VRE prior to final confirmation.* [AIII]
- 3.62** *The laboratory should employ methodologies that allow for as rapid as possible turnaround time for screening specimens for MRSA and VRE.* [AII]

- 3.63 **Laboratories should save isolates of MRSA and VRE (one isolate per patient) for a minimum of six months.** [AIII]
- 3.64 **Laboratory support during outbreak investigation should include the ability to obtain molecular typing.** [AIII]

Outbreak Control

An outbreak of MRSA or VRE occurs when there is an increase in the rate of new cases (infected and colonized) over the background rate, or a clustering of new cases due to the transmission of a specific microbial strain(s) in a health care setting. Clustering is the occurrence of two or more cases closely related by time, location, or other epidemiologic linkages.¹²⁵ In a health care setting with no previous MRSA or VRE, one case would warrant an investigation. For centres where MRSA and VRE are endemic, it is important to regularly monitor background rates to determine whether an outbreak has occurred.¹²⁶

Each health care setting should have in place a policy regarding outbreak management, including an MRSA or VRE outbreak, includes forming a multidisciplinary committee and reviewing and auditing infection prevention and control policies and practices.

Refer to Table 1, “*Management of an Outbreak of MRSA or VRE*” for guidance regarding outbreak management.

Recommendations

- 3.65 **Each health care setting will have policies and procedures in place for responding to an outbreak, including MRSA and VRE.** [AIII]
- 3.66 **If MRSA or VRE are detected in a client/patient/resident who recently spent time in another health care setting, that setting must be informed about the findings.** [AIII]
- 3.67 **In the event of an outbreak of MRSA or VRE, a multidisciplinary committee should be formed to review the situation and to provide guidance and support.** [AIII]
- 3.68 **Consideration should be given to obtaining assistance from other local agencies or experts if a health care facility lacks resources or expertise for outbreak control.** [AIII]
- 3.69 **In acute care settings, cohort staffing is recommended in an outbreak.**¹²⁷ [BII]
- 3.70 **Visitors must use the same PPE as staff during an outbreak of MRSA or VRE.** [BIII]
- 3.71 **In the event of an uncontrolled outbreak, the multidisciplinary committee should consider closing the affected area to further admissions.** [AII]
- 3.72 **The multidisciplinary committee will declare an outbreak to be over when there is evidence that no additional cases are occurring and that all Additional Precautions are being followed.** [BIII]
- 3.73 **Debriefing will take place following an MRSA or VRE outbreak, with emphasis on lessons learned and feedback to staff.** [BIII]

TABLE 1: Management of an Outbreak of MRSA or VRE

<u>Management of an Outbreak of MRSA or VRE</u>	
1.	Place each patient on Additional Precautions as soon as possible after identification of MRSA or VRE.
2.	Form a multidisciplinary outbreak management team to review the situation and provide guidance and support. Members of the team should include representatives from the affected unit/ward.
3.	Establish lines of communication: <ol style="list-style-type: none"> a. Communicate with the client/patient/resident and their family regarding the reason for Additional Precautions, while maintaining client/patient/resident confidentiality (see Section 3.12 and Sections 4.2 to 4.4). <u>Refer to Appendix F</u> for samples of client/patient/resident and family information sheets. b. If clients/patients/residents from the affected floor/unit require transfer, notify the receiving health care setting or department that the client/patient/resident is coming from an outbreak floor/unit and that Additional Precautions are required until the client/patient/resident is deemed to be cleared of MRSA or VRE. c. Maintain communication with local experts and networks. Consider requesting assistance from the local Public Health Unit, the Regional Infection Control Network, or an academic Health Science Centre if a health care setting does not have the expertise or resources to deal with an outbreak of MRSA or VRE. d. Communicate daily with facility leadership and staff as to the progress of the outbreak.
4.	Identify contacts of each new case of MRSA or VRE: <ol style="list-style-type: none"> a. Take surveillance specimens from all clients/patients/residents that are contacts (i.e. roommates) of the source client/patient/resident as well as others who were in close geographic proximity to the source client/patient/resident (see Sections 2.7 to 2.8). b. Consider screening staff contacts (see Section 3.39) if the outbreak is due to the same strain of MRSA and new cases are identified despite precautions. c. Place a flag (e.g. electronic notification, chart sticker) on the electronic/paper chart of any client/patient/resident that is considered to be a contact of MRSA or VRE but who has subsequently been discharged, to enable screening on readmission (see Section 3.57).
5.	Initiate prevalence screening/surveillance: <ol style="list-style-type: none"> a. Consider conducting a prevalence screen/surveillance on the affected floor/unit if additional cases are found after doing contact tracing, particularly if these cases have the same strain as the source client/patient/resident (see Section 2.9). b. Continue prevalence screening on a regular basis (e.g. weekly) until at least two consecutive screens are negative. A single negative result may not be adequate to determine that no further transmission has taken place.
6.	Implement staff education: <ol style="list-style-type: none"> a. Conduct in-service education on the affected floor/unit and other departments as necessary. b. If the outbreak affects multiple areas of the facility, hospital-wide education may be required.
7.	Review environmental cleaning and equipment cleaning practices as well as management and storage of supplies. <ol style="list-style-type: none"> a. Routine cleaning may not be adequate to remove VRE from contaminated surfaces. <u>Refer to Appendix J</u> for a sample daily cleaning checklist for rooms contaminated with VRE. b. In situations with persistent VRE transmission consideration may be given to post-cleaning environmental cultures to document that discharge cleaning of rooms is adequate.
8.	Review and audit infection prevention and control strategies and practices.
9.	Attempt to identify a source for the outbreak: <ol style="list-style-type: none"> a. Conduct an investigation and review the client/patient/record to attempt to determine the source of the MRSA or VRE (e.g. history of care in another health care setting, client/patient/resident contacts and recent transfer from high-risk units/floors). <u>Refer to Appendix I</u> for a sample investigation protocol. b. Send isolates for molecular typing (one isolate per case). c. Review laboratory results. d. If the source is the current health care setting, an active search should be initiated to detect additional cases (see Section 2.7 to 2.9) and possible links between cases, such as equipment, procedures or common staff assignments. e. If the source is another health care setting, that facility must be informed about the findings.
10.	Cohorting of patients and staff: <ol style="list-style-type: none"> a. Initiate cohorting of patients. See Section 3.10 for more information about cohorting patients. b. Consideration should be given to cohorting staff until the outbreak is resolved.
11.	Consider closing a floor/unit to further admissions or transfers until the outbreak is resolved.
12.	Ensure that the laboratory is saving isolates of MRSA and VRE (one isolate per case) in case further tests are required (e.g. molecular typing).
13.	An outbreak of MRSA or VRE may be declared over by the multidisciplinary team when there is evidence that no additional cases are occurring and that all Additional Precautions are being followed: <ol style="list-style-type: none"> a. At least two prevalence screens should be conducted on the affected floor/unit, taken one week apart, to verify that there are no new cases.

4. Education

In order to implement best practices, communication is essential. A key element in this communication is the education of staff on the epidemiology, prevention and control of MRSA and VRE. Education may improve compliance with Routine Practices and Additional Precautions and most attempts to control MRSA or VRE have included education of staff as part of their strategy.⁹³ Education of clients/patients/residents and visitors is also important to ensure compliance with established practices.

Recommendations

- 4.1 Education concerning the epidemiology, prevention and control of MRSA and VRE should be given to health care staff to ensure that they are knowledgeable regarding transmission and the correct use of PPE and to enable them to use and teach Additional Precautions appropriately.**^{46,89,128,129} [BIII]

Refer to Appendix E, “Sample Fact Sheets for Health Care Staff (MRSA, VRE)”; Appendix D, “PIDAC’s Hand Hygiene Fact Sheet for Health Care Settings”; and Appendix G, “PIDAC’s Routine Practices Fact Sheet for Health Care Settings”.

- 4.2 Clients/patients/residents should be taught correct hand hygiene and should be encouraged to remind anyone entering the room to perform hand hygiene before and after leaving the room.** [BIII]

Patients should be provided with information about MRSA or VRE on discharge (refer to Appendix F, “Sample Information Sheets for Patients and Visitors”).

- 4.3 In addition to hand hygiene, client/patient/resident teaching should include basic hygiene practices that prevent the spread of microorganisms, such as not sharing personal items and covering their mouth when coughing.** [BIII]

Education should include information about the precautions being used and the rationale for their use.¹²⁹

- 4.4 Visitors should receive instruction regarding specific facility control measures that might be in place before they visit a client/patient/resident.**¹²⁹ [BIII]

- a) Hand hygiene before and after visiting should be emphasized.
- b) Information sheets may be provided to visitors (refer to Appendix E, “Sample Information Sheets for Patients and Visitors”).

5. Antibiotic Stewardship

VRE and MRSA are both associated with the use of antibiotics and the risk of MRSA has been related to the duration and frequency of prior antibiotic use.^{46,130} 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.¹³¹

Recommendations

- 5.1 **Policies and procedures should be implemented to promote judicious antibiotic use, in order to limit the increase and spread of antibiotic resistant microorganisms.**^{46,50,132} [AII]
- 5.2 **Health care settings should institute formulary control of antibiotics and should conduct regular reviews of antibiotic utilization.**^{46,133} [AIII]

6. Program Evaluation

An ongoing review of both process and outcomes is important to prevent the spread of MRSA or VRE.

Recommendation

- 6.1 **MRSA and VRE prevention and control programs must contain elements that support ongoing quality management and improvement.** [BII]
- a) Regular audits of screening practices, management of equipment, hospital cleaning and disinfection practices including reprocessing of shared equipment, and staff adherence to Routine Practices, particularly hand hygiene, should be conducted and staff should receive feedback about results.
 - b) It is important to have frontline staff, administrators and the infection prevention and control committee review surveillance data and provide feedback may prompt a review of practices and prevention measures:
 - i) Collate and analyse data. This may be facilitated by a data management system.
 - ii) Generate facility-associated infection rates.
 - iii) Create standardized reports from the data.
 - iv) Examine trends for source of MRSA or VRE.
 - v) Feedback rates and trends to staff.
 - c) There should be an ongoing plan of action to improve the processes and outcomes.¹³⁴
 - i) Prepare action plans to address issues that require education or changes in practice.

7. Management of VISA and VRSA

What are VISA and VRSA?

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

Vancomycin-Resistant *Staphylococcus aureus* (VRSA) is a strain of MRSA that contains the resistance genes VAN-A or VAN-B, with an MIC to vancomycin of ≥ 32 mcg/ml. To date all VRSA have contained vancomycin resistance genes transferred from VRE strains.

Generally VISA and VRSA arise in patients who have been colonized or infected with MRSA and have received multiple or prolonged courses of vancomycin. Additionally, most cases have been co-colonized with MRSA and VRE for prolonged periods of time.

VISA/VRSA Acquisition and Transmission

The recent emergence of vancomycin-intermediate *Staphylococcus aureus* (VISA) and vancomycin-resistant *Staphylococcus aureus* (VRSA) have the potential for serious public health consequences if transmission between patients occurs. Because there is a lack of epidemiological data on their spread, a more extensive form of the Additional Precautions outlined in this document is recommended.^{2,46}

Current Status of VISA and VRSA in Canada and Ontario

Although there have been several cases of VISA and VRSA described in other countries,^{135,136} to date there have been no cases reported in Canada. Identification of VISA or VRSA must be treated as a sentinel event.

Recommendations

- 7.1 ***The health care setting's Infection Prevention and Control Professional and senior management must be notified whenever VISA or VRSA is identified.*** [AIII]

The Medical Officer of Health may be advised non-nominally whenever VISA or VRSA is isolated.

- 7.2 ***Expert advice should be sought whenever VISA or VRSA is isolated (e.g. the Regional Infection Control Network, infection control experts from academic health sciences centres, the Provincial Infectious Diseases Advisory Committee).*** [AIII]

- 7.3 ***In addition to Routine Practices and all of the previous recommendations for MRSA, Additional Precautions for VISA/VRSA include***^{46,137} : [AII]

- a) ***Single room accommodation is required.***
- b) ***Dedicated equipment and supplies are required.***
- c) ***Minimize the number of persons who enter the room.***
- d) ***Patient must remain in their room except for essential procedures.***
- e) ***Transfer between facilities should only be done if medically necessary. The receiving health care setting must be advised of the required precautions.***
- f) ***Avoid transfer within the facility if possible; if transfer is unavoidable, the receiving unit or department must be advised of the required precautions.***
- g) ***Each patient contact must be placed on VISA/VRSA precautions and actively screened.***

- 7.4 ***Every attempt should be made to identify the source of VISA/VRSA.*** [AII]

III. Summary of Best Practices for Infection Prevention and Control of Resistant *Staphylococcus aureus* and *Enterococci* in All Health Care Settings

(See complete text for rationale)

1. Programs for the Prevention and Control of MRSA and VRE

- 1.1 ***Each health care setting should have a prevention and control program for MRSA and VRE. [AII]***
- 1.2 ***Patients should receive health care based on their overall care needs, despite colonization with MRSA and/or VRE. [BII]***
- 1.3 ***It should be recognized that prevention and control programs for MRSA and VRE have the potential to negatively impact on the frequency of preventable adverse events and patient satisfaction, therefore programs should include components that identify and remedy decreases in the quality of patient care resulting from the implementation of Additional Precautions. [BII]***

2. Screening for MRSA and VRE

- 2.1 ***Screening for risk factors for MRSA and VRE should include a screening tool that is applied to all clients/patients/residents admitted to the health care facility. [AII]***
- 2.2 ***Regulated health professionals in health care facilities are expected to take screening specimens from clients/patients/residents at increased risk for MRSA and VRE on admission as part of an MRSA and VRE prevention and control program. [AII]***
- 2.3 ***Whenever a single positive specimen from a single site is identified, consideration should be given to confirming with a repeat specimen. [BIII]***
- 2.4 ***Every effort should be made to try to determine the source of new cases of MRSA or VRE. Every new case should warrant an investigation. [AIII]***
- 2.5 ***All affected health care settings should be notified following the identification of a new case of MRSA or VRE or identification of a new contact of a case. [AIII]***
- 2.6 ***Any client/patient/resident who is considered to be an MRSA or VRE contact is to have at least one set of screening specimens taken. If initial specimens are negative it is prudent to repeat them. [BIII]***
- 2.7 ***During an outbreak, all client/patient/resident contacts with common risk factors should be actively screened. [BIII]***
- 2.8 ***Consideration should be given to conducting point prevalence screens on units/areas where clients/patients/residents are at high risk for acquiring MRSA or VRE during their stay in the health care setting. [BIII]***

- 2.9 **Point prevalence screens should be conducted in any area where MRSA or VRE transmission is occurring. If analysis of the prevalence screen results for MRSA or VRE identifies further transmission, then additional screening should be conducted until no further transmission is detected.** [BIII]
- 2.10 **Specimens for detection of MRSA should include:** [All]
- a) **a swab from the anterior nares; AND**
 - b) **a swab from the perianal area*; AND**
 - c) **a swab from skin lesions, wounds, incisions, ulcers and exit sites of indwelling devices, if present, using appropriate aseptic technique where indicated.**
 - d) **For newborn infants, a swab from the umbilicus should also be taken.**
- * a perineal or groin swab is also acceptable
- 2.11 **Specimens for detection of VRE must include stool or a swab from the rectum or anus. Stool specimens are preferred as they provide a higher yield.** [All]

3. Prevention and Control Measures For MRSA and VRE

- 3.1 **Hand hygiene must be performed by all staff before and after each contact with a client/patient/resident or contact with environmental surfaces near the client/patient/resident.** [All]
- 3.2 **Clients/patients/residents should be encouraged and assisted in performing hand hygiene before leaving their room.** [All]
- 3.3 **If hands are not visibly contaminated then the use of an alcohol-based hand rub is preferred.** [A]
- 3.4 **Washing hands with soap and water is required if there is visible soiling with dirt, blood, body fluids or other body substances.** [All]
- 3.5 **In ambulatory/clinic settings, hand hygiene facilities must be available and clients should be encouraged to perform hand hygiene upon arrival and before leaving.** [All]
- 3.6 **Each health care setting should have policies in place that identify clients/patients/residents who are at the highest risk for colonization with MRSA or VRE, so that they may be placed on Contact Precautions until the results of screening tests are available.** [CIII]
- 3.7 **Each health care setting should have a policy authorizing any nurse and/or Infection Prevention and Control Professional to initiate the appropriate Additional Precautions and maintain precautions until results are confirmed.** [CIII]
- 3.8 **It is strongly recommended that clients/patients/residents known to be colonized or infected with MRSA or VRE be placed in a single room with individual toileting facilities.** [BIII] **In acute care settings, MRSA-positive or VRE-positive patients should not share rooms with MRSA-negative or VRE-negative patients.**
- 3.9 **When single rooms for Contact Precautions are limited, priority should be given to clients/patients/residents who are at increased risk of disseminating microorganisms into the environment.** [CIII]

- 3.10 ***If a single room is not available, clients/patients/residents known to be colonized or infected with MRSA or VRE may be cohorted with other clients/patients/residents after consultation with the Infection Prevention and Control Professional. [CIII]***
- 3.11 ***Signage indicating the required Contact Precautions should be posted at the entrance to the client/patient/resident's room. Signage should maintain privacy by indicating only the precautions that are required, not information regarding the client/patient/resident's condition. [CIII]***
- 3.12 ***Clients/patients/residents and visitors must be informed about the reason for implementing Additional Precautions and be educated in the proper use of hand hygiene and Contact Precautions. [CIII]***
- 3.13 ***In acute care settings, gloves must be worn when entering the room or bed space of any patient who has, or is suspected of having, infection or colonization with MRSA or VRE. [AII]***
- 3.14 ***In acute care settings, a long-sleeved gown should be worn when entering the room or bed space of any patient who has, or is suspected of having, infection or colonization with MRSA [BIII] or VRE [BII].***
- 3.15 ***In acute care settings, consideration may be given to wearing a surgical mask as part of the precautions when entering the room of a patient colonized or infected with MRSA, to decrease nasal acquisition by health care workers. [BII]***
- 3.16 ***In acute care settings, gloves and long-sleeved gown (and mask, if worn) must be removed, discarded and hand hygiene performed immediately on leaving the room or bed space of a patient who has, or is suspected of having, infection or colonization with MRSA or VRE. [AII]***
- 3.17 ***In non-acute care settings, Contact Precautions may need to be adapted so that clients/residents can take part in therapeutic and social activities while limiting physical contact, and there should be emphasis on staff and client/resident hand hygiene. [BIII]***
- 3.18 ***In non-acute care settings, gloves must be worn when providing direct care to any client/resident who has, or is suspected of having, infection or colonization with MRSA or VRE. [CIII]***
- 3.19 ***In non-acute care settings, a long-sleeved gown should be worn when providing direct care to any client/resident who has, or is suspected of having, infection or colonization with MRSA or VRE. [CIII]***
- 3.20 ***In non-acute care settings, consideration may be given to wearing a surgical mask for the provision of direct care to clients/residents with MRSA, to decrease nasal acquisition by health care workers. [All]***
- 3.21 ***In non-acute care settings, gloves and long-sleeved gown (and mask, if worn) must be removed, discarded and hand hygiene performed immediately on leaving the room or bed space of a client/resident who has, or is suspected of having, infection or colonization with MRSA or VRE. [BIII]***
- 3.22 ***Dedicate equipment to a single client/patient/resident on Contact Precautions. If MRSA-positive or VRE-positive patients are cohorted, equipment may be cohorted. [BIII]***

- 3.23 **Health care settings should review their cleaning methods to ensure that they are adequate for disinfection of contaminated surfaces.** [CIII]
- 3.24 **As indicated in Routine Practices, rooms and dedicated equipment used for clients/patients/residents with MRSA must be thoroughly cleaned and then disinfected using a hospital-grade disinfectant upon discharge of the client/patient/resident.** [BIII]
- 3.25 **Stringent protocols are required for the daily cleaning of rooms contaminated with VRE.** [CIII]
- 3.26 **There must be a process to ensure that there has been adequate cleaning and disinfection of rooms and shared non-medical equipment contaminated with VRE following patient discharge. This may be accomplished through the use of a task checklist to ensure that all areas and surfaces are cleaned and disinfected and that post-cleaning inspection of the room has taken place.** [BIII]
- 3.27 **Routine health care cleaning practices for laundering linens are adequate for eliminating MRSA and VRE.** [A]
- 3.28 **All curtains (privacy, window and shower) should be removed and laundered after discharge of a client/patient/resident with VRE.** [BIII]
- 3.29 **The MRSA or VRE status of a client/patient/resident should not affect the decision about transferring the individual to any health care setting and a negative result is not required prior to the transfer.** [AIII]
- 3.30 **Before transferring a client/patient/resident with MRSA or VRE, all individuals involved in the transfer and the receiving department or health care setting should be informed about the client/patient/resident's status so that appropriate precautions may be taken and placement may be arranged.** [BIII]
- 3.31 **In acute care settings, staff should wear gloves and a long-sleeved gown if they will have physical contact during transport of a patient colonized or infected with MRSA.** [BIII]
- 3.32 **In non-acute care settings, staff should wear appropriate PPE if they will have physical contact (e.g. lifting) during transport of a client/resident who is colonized or infected with MRSA.** [BIII]
- 3.33 **Staff must wear gloves and a long-sleeved gown if they will have physical contact during transport of a client/patient/resident who is colonized or infected with VRE.** [BIII]
- 3.34 **Transport equipment and equipment or surface that have had direct or indirect contact with a client/patient/resident who is colonized or infected with MRSA and who undergoes a medical, surgical or diagnostic procedure in another department, must be cleaned immediately after the client/patient/resident leaves, using a hospital-grade disinfectant.** [BIII]
- 3.35 **Transport equipment and equipment or surfaces that have had direct or indirect contact with a client/patient/resident who is colonized or infected with VRE and who undergoes a medical, surgical or diagnostic procedure in another department, must be cleaned immediately after the client/patient/resident leaves, following protocols for VRE decontamination.** [BIII]

- 3.36 ***In acute care settings, prior to leaving their room, patients colonized or infected with MRSA or VRE should be assessed on a case-by-case basis to determine their risk of transmission. [BIII]***
- 3.37 ***In non-acute care settings, clients/residents colonized or infected with MRSA or VRE are not required to remain in their room. [BIII]***
- 3.38 ***Staff must receive education in the correct and consistent use of Routine Practices as a fundamental aspect of infection prevention and control in health care settings, with emphasis on hand hygiene and appropriate use of PPE. [BIII]***
- 3.39 ***Screening of staff for MRSA should be considered when an outbreak of the same strain of MRSA continues to spread despite adherence to control measures, or when an individual is strongly epidemiologically linked to new acquisitions of MRSA. [BIII]***
- 3.40 ***Decolonization of staff colonized with MRSA should be done when they are epidemiologically linked to an outbreak with the same strain and adherence to Additional Precautions has failed to contain the outbreak.***
- 3.41 ***If staff are colonized with a strain of MRSA that is different from the outbreak strain, decolonization may be considered. [BIII]***
- 3.42 ***All health care settings should have written information available for clients/patients/residents that describes Contact Precautions, explaining why they are important. [BIII]***
- 3.43 ***Visitors should receive education and training in correct hand hygiene procedures with emphasis on the importance of hand hygiene after physical contact with the client/patient/resident and on exit from the room. [BIII]***
- 3.44 ***In acute care, visitors should wear PPE if they will be providing direct care to a patient who is colonized or infected with MRSA or VRE, or if they will be visiting other patients after visiting a patient who is colonized or infected with MRSA or VRE. [BIII]***
- 3.45 ***In non-acute care settings, visitors should wear appropriate PPE according to Routine Practices if involved in providing direct care to a client/patient/resident who is colonized or infected with MRSA or VRE. [CIII]***
- 3.46 ***Routine decolonization therapy of MRSA clients/patients/residents is not currently recommended. [EII]***
- 3.47 ***Efforts at VRE decolonization are not effective and this is not recommended. [EI]***
- 3.48 ***In situations where a client/patient/resident colonized with MRSA is implicated in an outbreak, decolonization may be considered in consultation with the health care setting's Infection Prevention and Control Professional. [BIII]***
- 3.49 ***The health care setting should have a policy that permits discontinuation of Additional Precautions only in consultation with the Infection Prevention and Control Professional or designate. [BIII]***

- 3.50 ***If MRSA or VRE infection is treated with an antimicrobial to which the MRSA or VRE is sensitive, follow-up specimens should be done after discontinuation of therapy and prior to discontinuation of Additional Precautions. [BIII]***
- 3.51 ***If decolonization of MRSA has been attempted, the client/patient/resident may be considered to be at low risk for transmission of MRSA if there have been three sets of negative specimens taken at least one week apart. [BIII]***
- 3.52 ***If decolonization of MRSA is not attempted, no further specimens should be taken during the current admission. [EIII]***
- 3.53 ***In acute care, if Additional Precautions have been discontinued, weekly screening for the duration of hospitalization is recommended following clearing of MRSA, since re-colonization can occur. [BIII]***
- 3.54 ***In non-acute care, if Additional Precautions have been discontinued, monthly screening for 6 months is recommended following clearing of MRSA. [BIII]***
- 3.55 ***In community care, re-screening is not required following clearing of MRSA. [EIII]***
- 3.56 ***Re-colonization with MRSA or VRE may occur once a client/patient/resident has been discharged from the health care system, and specimens should be repeated on each readmission. [AII]***
- 3.57 ***The Infection Prevention and Control Professional(s) of the health care setting should have the responsibility to determine flagging and unflagging of clients/patients/residents with MRSA or VRE. [CIII]***
- 3.58 ***Place a flag (e.g. electronic notification, chart sticker) on the electronic/paper chart of any client/patient/resident who is colonized or infected with MRSA or VRE and note the MRSA or VRE status in their medical record. Flags must protect the confidentiality of the client/patient/resident. [BII]***
- 3.59 ***Place a flag (e.g. electronic notification, chart sticker) on the electronic/paper chart of any client/patient/resident who is considered to be a contact of MRSA or VRE but who has subsequently been discharged, to enable screening on readmission. Flags must protect the confidentiality of the client/patient/resident. [BII]***
- 3.60 ***A tracking system and database of flagged clients/patients/residents should be in place to help identify them on readmission. [BII]***
- 3.61 ***Laboratories should recognize that turnaround time is a critical issue in the prevention of transmission of MRSA and VRE. Infection Prevention and Control Professionals and their laboratories should develop reporting systems into their protocols that notify ICPs of suspected MRSA and VRE prior to final confirmation. [AIII]***
- 3.62 ***The laboratory should employ methodologies that allow for as rapid as possible turnaround time for screening specimens for MRSA and VRE. [AII]***
- 3.63 ***Laboratories should save isolates of MRSA and VRE (one isolate per patient) for a minimum of six months. [AIII]***
- 3.64 ***Laboratory support during outbreak investigation should include the ability to obtain molecular typing. [AIII]***

- 3.65 ***Each health care setting will have policies and procedures in place for responding to an outbreak, including MRSA and VRE. [AIII]***
- 3.66 ***If MRSA or VRE are detected in a client/patient/resident who recently spent time in another health care setting, that setting must be informed about the findings. [AIII]***
- 3.67 ***In the event of an outbreak of MRSA or VRE, a multidisciplinary committee should be formed to review the situation and to provide guidance and support. [AIII]***
- 3.68 ***Consideration should be given to obtaining assistance from other local agencies or experts if a health care facility lacks resources or expertise for outbreak control. [AIII]***
- 3.69 ***In acute care settings, cohort staffing is recommended in an outbreak. [BII]***
- 3.70 ***Visitors must use the same PPE as staff during an outbreak of MRSA or VRE. [BIII]***
- 3.71 ***In the event of an uncontrolled outbreak, the multidisciplinary committee should consider closing the affected area to further admissions. [AII]***
- 3.72 ***The multidisciplinary committee will declare an outbreak to be over when there is evidence that no additional cases are occurring and that all Additional Precautions are being followed. [BIII]***
- 3.73 ***Debriefing will take place following an MRSA or VRE outbreak, with emphasis on lessons learned and feedback to staff. [BIII]***

4. Education

- 4.1 ***Education concerning the epidemiology, prevention and control of MRSA and VRE should be given to health care staff to ensure that they are knowledgeable regarding transmission and the correct use of PPE and to enable them to use and teach Additional Precautions appropriately. [BIII]***
- 4.2 ***Clients/patients/residents should be taught correct hand hygiene and should be encouraged to remind anyone entering the room to perform hand hygiene before and after leaving the room. [BIII]***
- 4.3 ***In addition to hand hygiene, client/patient/resident teaching should include basic hygiene practices that prevent the spread of microorganisms, such as not sharing personal items and covering their mouth when coughing. [BIII]***
- 4.4 ***Visitors should receive instruction regarding specific facility control measures that might be in place before they visit a client/patient/resident. [BIII]***

5. Antibiotic Stewardship

- 5.1 ***Policies and procedures should be implemented to promote judicious antibiotic use, in order to limit the increase and spread of antibiotic resistant microorganisms. [AII]***

- 5.2 **Health care settings should institute formulary control of antibiotics and should conduct regular reviews of antibiotic utilization.** [AIII]

6. Program Evaluation

- 6.1 **MRSA and VRE prevention and control programs must contain elements that support ongoing quality management and improvement.** [BII]

7. Management of VISA and VRSA

- 7.1 **The health care setting's Infection Prevention and Control Professional and senior management must be notified whenever VISA or VRSA is identified.** [AIII]
- 7.2 **Expert advice should be sought whenever VISA or VRSA is isolated (e.g. the Regional Infection Control Network, infection control experts from academic health sciences centres, the Provincial Infectious Diseases Advisory Committee).** [AIII]
- 7.3 **In addition to Routine Practices and all of the previous recommendations for MRSA, Additional Precautions for VISA/VRSA include:** [AII]
- a) **Single room accommodation is required.**
 - b) **Dedicated equipment and supplies are required.**
 - c) **Minimize the number of persons who enter the room.**
 - d) **Patient must remain in their room except for essential procedures.**
 - e) **Transfer between facilities should only be done if medically necessary. The receiving health care setting must be advised of the required precautions.**
 - f) **Avoid transfer within the facility if possible; if transfer is unavoidable, the receiving unit or department must be advised of the required precautions.**
 - g) **Each patient contact must be placed on VISA/VRSA precautions and actively screened.**
- 7.4 **Every attempt should be made to identify the source of VISA/VRSA.** [AII]

Appendix A: Grading System for Recommendations

Categories for strength of each recommendation	
CATEGORY	DEFINITION
A	Good evidence to support a recommendation for use.
B	Moderate evidence to support a recommendation for use.
C	Insufficient evidence to support a recommendation for or against use
D	Moderate evidence to support a recommendation against use.
E	Good evidence to support a recommendation against use.
Categories for quality of evidence on which recommendations are made	
GRADE	DEFINITION
I	Evidence from at least one properly randomized, controlled trial.
II	Evidence from at least one well-designed clinical trial without randomization, from cohort or case-controlled analytic studies, preferably from more than one centre, from multiple time series, or from dramatic results in uncontrolled experiments.
III	Evidence from opinions of respected authorities on the basis of clinical experience, descriptive studies, or reports of expert committees.

Source: Health Canada/Public Health Agency of Canada Guidelines

Appendix B: Collecting Specimens for MRSA and VRE

[Adapted from University Health Network, Sunnybrook Health Sciences Centre and Women's College Hospital]

Check with your laboratory regarding appropriate specimens for detection of MRSA and VRE

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

MRSA Screening Procedure for Cultures/Molecular Detection:

- Pre-moisten all swabs with sterile normal saline or with transport medium prior to taking a specimen.
- Swab anterior nares (use the same swab for both nostrils). Use a circular motion to touch as much mucous membrane as possible.
- Swab perianal/perineal skin or groin with a new swab.
- Swab wounds/skin lesions/incisions/ulcers if present with separate swabs.
- Swab exit sites of indwelling devices if present.
- Label the individual specimens appropriately.

VRE Screening Procedure for Cultures/Molecular Detection:

- Stool or a rectal or anal swab may be used for VRE screening. Stool specimens are preferred as the yield is higher.
- If a swab is used, pre-moisten the swab with sterile normal saline or with transport medium prior to taking a specimen.
- Swab around the external rectal orifice. If visible stool is not obtained on the swab, insert it a few millimetres into the rectum until visible stool is obtained.
- Label the individual specimens appropriately.

Appendix C – Sample Admission Form for Screening for MRSA and VRE

[Adapted from Sunnybrook Health Sciences Centre and Women's College Hospital]

Antibiotic Resistant Organisms (ARO) Admission Screen (for all patients)	
<input type="checkbox"/>	RN/RPN must 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.
<input type="checkbox"/>	Check electronic patient chart for patient attributes of VRE or MRSA (e.g. precaution flag)
Risk factors for Antibiotic Resistant Organisms:	
<input type="checkbox"/> yes <input type="checkbox"/> 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.
<input type="checkbox"/> yes <input type="checkbox"/> no	Direct transfer from another hospital, nursing home, retirement home or other health care facility.
<input type="checkbox"/> yes <input type="checkbox"/> 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)
<input type="checkbox"/> yes <input type="checkbox"/> no	Patient receiving home health care services or receiving dialysis
<input type="checkbox"/> yes <input type="checkbox"/> no	Patient living in a communal living setting (e.g. shelter, halfway house, correctional facility)
<input type="checkbox"/> yes <input type="checkbox"/> 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: <ul style="list-style-type: none"> • 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).
<input type="checkbox"/>	Specimens sent: Date: _____ Print Signature & Sign (RN/RPN): _____
<input type="checkbox"/>	Patient refused specimens. Notify the Infection Prevention & Control Professional or delegate. Date: _____ Print Signature & Sign (RN/RPN) _____

Appendix D – PIDAC'S Hand Hygiene Fact Sheet for Health Care Settings

In health care settings, hand hygiene is the single most important way to prevent infections.

Hand hygiene is the responsibility of all individuals involved in health care. Hand hygiene refers to removing or killing microorganisms on the hands as well as maintaining good skin integrity. There are two methods of removing/killing microorganisms on hands: washing with soap and running water or using an alcohol-based hand rub. Generally, the focus is on microorganisms that have been picked up by contact with patients/health care provider, contaminated equipment, or the environment (transient or contaminating bacteria).

Effective hand hygiene kills or removes microorganisms on the skin and maintains hand health.

ALCOHOL-BASED HAND RUB

Alcohol-based hand rub is the preferred method for decontaminating hands. Using alcohol-based hand rub is better than washing hands (even with an antibacterial soap) when hands are not visibly soiled.

However, hand washing with soap and running water must be performed when hands are visibly soiled. If running water is not available, use moistened towelettes to remove the visible soil, followed by alcohol-based hand rub.

HAND WASHING

Most transient bacteria present on the hands are removed during the mechanical action of washing, rinsing and drying hands. Hand washing with soap and running water must be performed when hands are visibly soiled.

WHEN SHOULD HAND HYGIENE BE PERFORMED?

Hand hygiene must be performed:

- Before and after contact with a patient
- Before performing invasive procedures
- Before preparing, handling, serving or eating food
- After care involving the body fluids of a patient (e.g. assisting patient to blow nose, toileting the patient or doing wound care) and before moving to another activity
- Before putting on and after taking off gloves
- After personal body functions, such as using the toilet or blowing one's nose
- Whenever a health care provider is in doubt about the necessity for doing so.
- When hands accidentally come into contact with secretions, excretions, blood and body fluids (hands must be washed with soap and running water)
- After contact with items in the patient's environment

FACTORS THAT INFLUENCE HAND HYGIENE

The following factors influence the effectiveness of hand hygiene:

- Condition of the skin— intact skin vs. presence of dermatitis, cracks, cuts or abrasions
- Nails: natural nails more than 3-4 mm (1/4-inch) long are difficult to clean, can pierce gloves and harbour more microorganisms than short nails
- Only nail polish in good condition is acceptable
- Artificial nails or nail enhancements are not to be worn by those giving patient care as they have been implicated in the transfer of microorganisms
- Jewellery - rings and bracelets hinder hand hygiene, and should not be worn for patient contact; rings increase the number of microorganisms present on hands and increase the risk of tears in gloves

HAND HYGIENE AGENTS

Alcohol-based hand rubs:

- are recommended to routinely decontaminate hands in clinical situations when hands are not visibly soiled
- provide for a rapid kill of most transient microorganisms
- contain a variety of alcohols in concentrations from 60 – 90%
- are not used with water
- contain emollients to reduce skin irritation
- are less time consuming than washing with soap and water

Liquid or Foam Soap:

- Soap must be dispensed in a disposable pump dispenser
- Soap containers are not to be topped up, as there is a risk of contamination
- Bar soaps are not acceptable in health care settings except for individual client/patient/resident personal use.
- Antibacterial soaps may be used in critical care areas such as ICU, or in other areas where invasive procedures are performed.

TECHNIQUES

Alcohol-based Hand Rub:

- Remove hand and arm jewellery. Jewellery is very hard to clean, and hides bacteria and viruses from the antiseptic action of the alcohol.
- Ensure hands are visibly clean (if soiled, follow hand washing steps).
- Apply between 1 to 2 full pumps of product, or squirt a loonie-sized amount, onto one palm.
- Spread product over all surfaces of hands, concentrating on finger tips, between fingers, back of hands, and base of thumbs. These are the most commonly missed areas.
- **Rub hands until product is dry*. This will take a minimum of 15 to 20 seconds if sufficient product is used.**

Hand Washing:

- Remove hand and arm jewellery. Jewellery is very hard to clean, and hides bacteria and viruses from the mechanical action of the washing.
- Wet hands with warm (not hot) water. Hot water is hard on the skin, and will lead to dryness.
- Apply liquid or foam soap. Do not use bar soap in health care settings as it may harbour bacteria that can then be spread to other users.
- Vigorously lather all surfaces of hands for a minimum of 15 seconds. Removal of transient or acquired bacteria requires a minimum of 15 seconds mechanical action. Pay particular attention to finger tips, between fingers, backs of hands and base of the thumbs. These are the most commonly missed areas.
- Using a rubbing motion, thoroughly rinse soap from hands. Residual soap can lead to dryness and cracking of skin.
- Dry hands thoroughly by blotting hands gently with a paper towel. Rubbing vigorously with paper towels can damage the skin.
- Turn off taps with paper towel, to avoid recontamination of your hands (NOTE: If hand air dryers are used, hands-free taps are necessary).

Other Issues

- Intact skin is the first line of defence, therefore careful attention to skin care is an essential part of the hand hygiene program.
 - A hand hygiene skin care program should be in place. Choice of products should also be "user-friendly."
 - If integrity of skin is an issue, the individual should be referred to Occupational Health for assessment.
- Use a skin lotion that does not interfere with glove integrity
- Note: It is reassuring to the patient to see that the health care provider performs hand hygiene, as patients have an increased awareness of the importance of hand hygiene.

* Hands must be fully dry before touching the patient or patient's environment/equipment for the hand rub to be effective and to eliminate the extremely rare risk of flammability in the presence of an oxygen-enriched environment.

Appendix E: Sample Fact Sheets for Health Care Staff (MRSA, VRE)

The staff fact sheets provided on the following pages are samples which may be adapted for use in your health care setting.

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 *S. aureus* can cause an infection. When *S. 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, wound dressings. MRSA can survive well on hands and can survive for weeks on inanimate objects such as door handles, bedrails, patient 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.

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 health care facilities outside of Canada
- ✓ Previous hospitalization or transfer between health care 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. Health care staff should review the correct method of hand hygiene, as well as demonstrate the proper donning/removal of personal protective equipment (PPE) to clients/patients/residents, families and visitors.

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

Hand hygiene should 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 & CONTROL OF MRSA:

1. Admission screening for MRSA must be completed:
 - ✓ Check for previous history of MRSA or high risk for MRSA using an admission screening tool.
 - ✓ If the client/patient/resident has previously had contact with an MRSA case, screening specimens must be obtained.
 - ✓ If the client/patient/resident is considered to be at risk for MRSA based on the results of the screening tool, screening specimens must be obtained.
2. If the client/patient/resident is known to have had MRSA in the past, **Additional Precautions** must be initiated:
 - ✓ Hand hygiene as described in Routine Practices
 - ✓ Appropriate client/patient/resident placement
 - ✓ Gloves for entering the patient's room or bed space in acute care, or for direct care of residents in long term care
 - ✓ Long-sleeved gown for entering the patient's room or bed space in acute care, or for direct care of residents in long term care if contamination is likely
 - ✓ A surgical mask may be worn if desired
 - ✓ Dedicated equipment or adequate cleaning and disinfecting of shared equipment, including transport equipment
 - ✓ Daily cleaning of all touched surfaces in the room
3. Notify the Infection Prevention and Control Professional or delegate to discuss the infection control management of client/patient/resident activities.
4. Precautions are **not** to be discontinued until reviewed by Infection Prevention & Control.
5. Additional surveillance specimens for colonization or 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 room.

Families/visitors who provide direct care must 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, toileting. Feeding or pushing a wheelchair are not classified as direct care.

3. Written information should be available for clients/patients/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 faeces. 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 which makes them susceptible to infection. These conditions include clients/patients/residents with:

- Recent hospitalization in health care facilities outside Canada
- 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. Health care staff should review the correct method of hand hygiene, as well as demonstrate the proper donning/removal of personal protective equipment (PPE) to clients/patients/residents, families and visitors.

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

Hand hygiene should 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 & CONTROL OF VRE:

1. Admission screening for VRE must 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 must 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 must be obtained.

2. If the client/patient/resident is known to have had VRE in the past, **Additional Precautions** must be initiated:

- ✓ Hand hygiene as described in Routine Practices
- ✓ Appropriate client/patient/resident placement
- ✓ Gloves for entering the patient's room or bed space in acute care, or for direct care of residents in long term care
- ✓ Long-sleeved gown for entering the patient's room or bed space in acute care, or for direct care of residents in long term care
- ✓ Dedicated equipment or adequate cleaning and disinfecting of shared equipment, including transport equipment
- ✓ Daily cleaning and disinfection of all touched surfaces in the room
- ✓ Special discharge cleaning protocol is vital for VRE

3. Notify the Infection Prevention & Control Professional or delegate to discuss the infection control management of client/patient/resident activities.

4. Precautions are **not** to be discontinued until reviewed by Infection Prevention and Control.

5. Additional surveillance specimens for colonization or client/patient/resident contact(s) may be required, as directed by Infection Prevention and Control.

FAMILY & VISITORS:

1. All families/visitors must practice good hand hygiene before 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, toileting. Feeding and pushing a wheelchair are not classified as direct care.

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

Appendix F: Sample Information Sheets for Patients and Visitors

**The patient and visitor information sheets provided
on the following pages
are samples which may be adapted for use
in your health care setting.**

METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA)

Information Sheet for Patients and Visitors

WHAT IS MRSA?

Staphylococcus aureus is a germ that lives on the skin and mucous membranes of healthy people. Occasionally *S. aureus* can cause an infection. When *S. 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 patients in the hospital. These precautions include:

- ✓ Single room accommodation (the door can remain open)
- ✓ A long-sleeved gown and gloves must 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 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 waterless alcohol 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 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 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 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 Patients 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 faeces. 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 patients in the hospital. These precautions include:

- ✓ Single room accommodation (the door can remain open)
- ✓ A long-sleeved gown and gloves must 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 wash your hands before you leave your room

WHAT ABOUT FAMILY/VISITORS?

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 waterless alcohol hand rub until hands are dry).

You need to clean your hands:

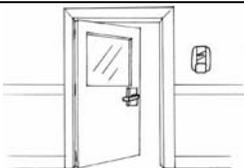
- ✓ After using the bathroom
- ✓ After blowing your nose
- ✓ Before eating and drinking
- ✓ Before and after you touch your dressing or wounds
- ✓ When your hands are visibly dirty (soiled)
- ✓ Before you leave your room

WHAT WILL HAPPEN AT HOME?

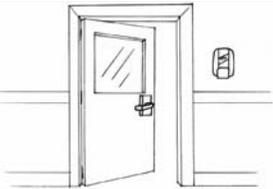
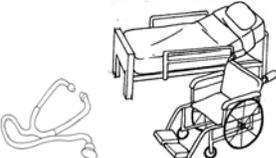
If you have VRE at the time of discharge from hospital, the chance of spreading the germ to your family is small. But, we do recommend you practice the following:

- ✓ Everyone who might help you with your personal hygiene or with going to the toilet 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 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.

Appendix G: Sample - PIDAC's Routine Practices Fact Sheet for Health Care Settings

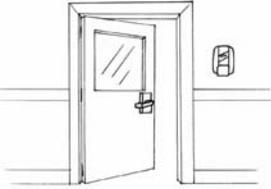
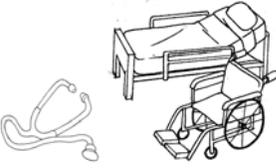
ROUTINE PRACTICES to be used with <u>ALL PATIENTS</u>	
	<p><i>Hand Hygiene</i></p> <p>Hand hygiene is performed using alcohol-based hand rub or soap and water:</p> <ul style="list-style-type: none"> ✓ Before and after each client/patient/resident contact ✓ Before performing invasive procedures ✓ Before preparing, handling, serving or eating food ✓ After care involving body fluids 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 hands come into contact with secretions, excretions, blood and body fluids ✓ After contact with items in the client/patient/resident's environment
	<p><i>Mask & Eye Protection or Face Shield</i></p> <ul style="list-style-type: none"> ✓ Protect eyes, nose and mouth during procedures and care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions. ✓ Wear within 1 meter of a coughing client/patient/resident.
	<p><i>Gown</i></p> <ul style="list-style-type: none"> ✓ Wear a long-sleeved gown if contamination of uniform or clothing is anticipated.
	<p><i>Gloves</i></p> <ul style="list-style-type: none"> ✓ Wear gloves when there is a risk of hand contact with blood, body fluids, secretions, excretions, non-intact skin, mucous membranes or contaminated surfaces or objects. ✓ Wearing gloves is NOT a substitute for hand hygiene. ✓ Perform hand hygiene after removing gloves
	<p><i>Environment</i></p> <ul style="list-style-type: none"> ✓ All equipment that is being used by more than one client/patient/resident must be cleaned between clients/patients/residents. ✓ All touched surfaces in the client/patient/resident's room must be cleaned daily.
	<p><i>Linen & Waste</i></p> <ul style="list-style-type: none"> ✓ Handle soiled linen and waste carefully to prevent personal contamination and transfer to other clients/patients/residents.
	<p><i>Sharps Injury Prevention</i></p> <ul style="list-style-type: none"> ✓ NEVER RECAP USED NEEDLES. ✓ Place sharps in sharps containers. ✓ Prevent injuries from needles, scalpels and other sharp devices.
	<p><i>Patient Placement/Accommodation</i></p> <ul style="list-style-type: none"> ✓ Use a single room for a client/patient/resident who contaminates the environment. ✓ Perform hand hygiene after leaving the room.

Appendix H: Sample Signage for Entrance to Room of a Patient with MRSA or VRE in Acute Care Facilities

ADDITIONAL/CONTACT PRECAUTIONS – Acute Care Facilities	
	<p><i>Hand Hygiene as per Routine Practices</i></p> <p>Hand hygiene is performed:</p> <ul style="list-style-type: none"> ✓ Before and after each patient contact ✓ Before performing invasive procedures ✓ Before preparing, handling, serving or eating food ✓ After care involving the body fluids of a patient and before moving to another activity ✓ Before putting on and after taking off gloves and other PPE ✓ After personal body functions (e.g. blowing one's nose) ✓ Whenever hands come into contact with secretions, excretions, blood and body fluids ✓ After contact with items in the patient's environment ✓ Whenever there is doubt about the necessity for doing so
	<p><i>Patient Placement</i></p> <ul style="list-style-type: none"> ✓ Use a single room with own toileting facilities. ✓ Door may remain open. ✓ Perform hand hygiene after leaving the room.
	<p><i>Gloves</i></p> <ul style="list-style-type: none"> ✓ Wear gloves when entering the patient's room or bed space. ✓ Wearing gloves is NOT a substitute for hand hygiene. ✓ Perform hand hygiene after removing gloves.
	<p><i>Gown</i></p> <ul style="list-style-type: none"> ✓ Wear a long-sleeved gown when entering the patient's room or bed space.
	<p><i>Environment</i></p> <ul style="list-style-type: none"> ✓ Dedicate routine equipment to the patient (e.g. stethoscopes, commodes). ✓ Disinfect all equipment that comes out of the room. ✓ All touched surfaces in the patient's room must be cleaned daily.
	<p><i>Visitors</i></p> <ul style="list-style-type: none"> ✓ Visitors must wear gloves and a long-sleeved gown if they will be in contact with other patients or will be providing <u>direct care</u>, as required by Routine Practices. ✓ Visitors must perform hand hygiene before entry and after leaving the room.

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 and pushing a wheelchair are not classified as direct care.

Sample Signage for Entrance to Room of a Patient with MRSA or VRE in Non-Acute Care Facilities

ADDITIONAL/CONTACT PRECAUTIONS – Non-acute Care Facilities	
	<p><i>Hand Hygiene as per Routine Practices</i></p> <p>Hand hygiene is performed:</p> <ul style="list-style-type: none"> ✓ Before and after each client/resident contact ✓ Before performing invasive procedures ✓ Before preparing, handling, serving or eating food ✓ After care involving the body fluids of a client/resident and before moving to another activity ✓ Before putting on and after taking off gloves and other PPE ✓ After personal body functions (e.g. blowing one's nose) ✓ Whenever hands come into contact with secretions, excretions, blood and body fluids ✓ After contact with items in the client/resident's environment ✓ Whenever there is doubt about the necessity for doing so ✓ Clean the client/resident's hands before they leave their room
	<p><i>Client/Resident Placement</i></p> <ul style="list-style-type: none"> ✓ Use a single room with own toileting facilities if client/resident hygiene is poor. ✓ Door may remain open. ✓ Perform hand hygiene after leaving the room.
	<p><i>Gloves</i></p> <ul style="list-style-type: none"> ✓ Wear gloves for <u>direct care</u>**. ✓ Wearing gloves is NOT a substitute for hand hygiene. ✓ Perform hand hygiene after removing gloves.
	<p><i>Gown</i></p> <ul style="list-style-type: none"> ✓ Wear a long-sleeved gown for <u>direct care</u> when clothing may become contaminated.
	<p><i>Environment</i></p> <ul style="list-style-type: none"> ✓ Dedicate routine equipment to the client/resident if possible (e.g. stethoscope, commode). ✓ Disinfect all equipment before it is used by another client/resident. ✓ All touched surfaces in the client/resident's room must be cleaned daily.
	<p><i>Visitors</i></p> <ul style="list-style-type: none"> ✓ Visitors must wear gloves and a long-sleeved gown if they will be providing <u>direct care as required by Routine Practices</u>. ✓ Visitors must perform hand hygiene before entry and after leaving the room.

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 and pushing a wheelchair are not classified as direct care.

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

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

MRSA

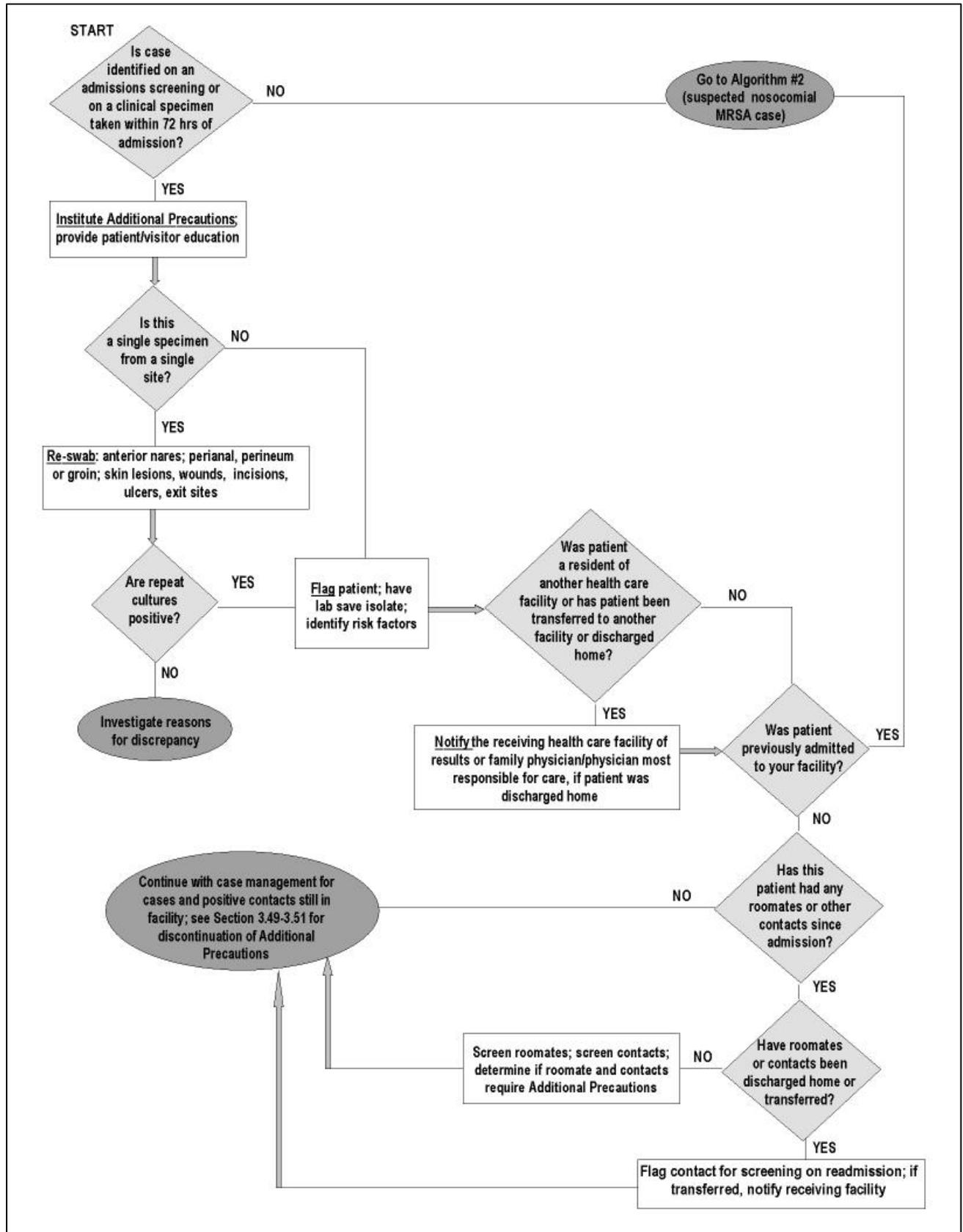
MRSA PRESENT AT ADMISSION:

Single MRSA case identified on admission screening
OR
Clinical specimen taken within 72 hours of admission

[Refer to Algorithm 1]

1. Institute Contact Precautions/Additional Precautions for patient with MRSA (see Section 3).
2. Provide patient and visitor education (see Section 3.42 and 3.43).
3. If only one specimen at one site is positive in a newly identified case, re-swab the patient (see Section 2.3):
 - a. Mislabelling of specimens may have occurred at the unit/ward level.
 - b. Error can occur at both the pre-analytical and post-analytical stages of laboratory processing.
 - c. Discrepant results may indicate a false-positive. If results of both sets of specimens do not concur, an investigation must be performed to identify the reasons for the discrepancy.
4. Flag patient (see Section 3.57 - 3.59).
5. Have laboratory save the isolate if this is not done routinely for first isolates (see Section 3.63).
6. Identify whether patient has risk factors for MRSA (see Section 2.1 and Section 3.6):
 - a. 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 be a nosocomial isolate at your facility (see page 62, "Nosocomial MRSA").
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 (see Section 2.5).
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/Additional 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 nosocomial cases, begin an investigation (see page 62, "Nosocomial MRSA").
9. Continue with case management for cases and positive contacts still in facility. See Sections 3.49 - 3.51 for discontinuation of Contact Precautions/Additional Precautions.

Algorithm 1: Management of a Single New Case of MRSA



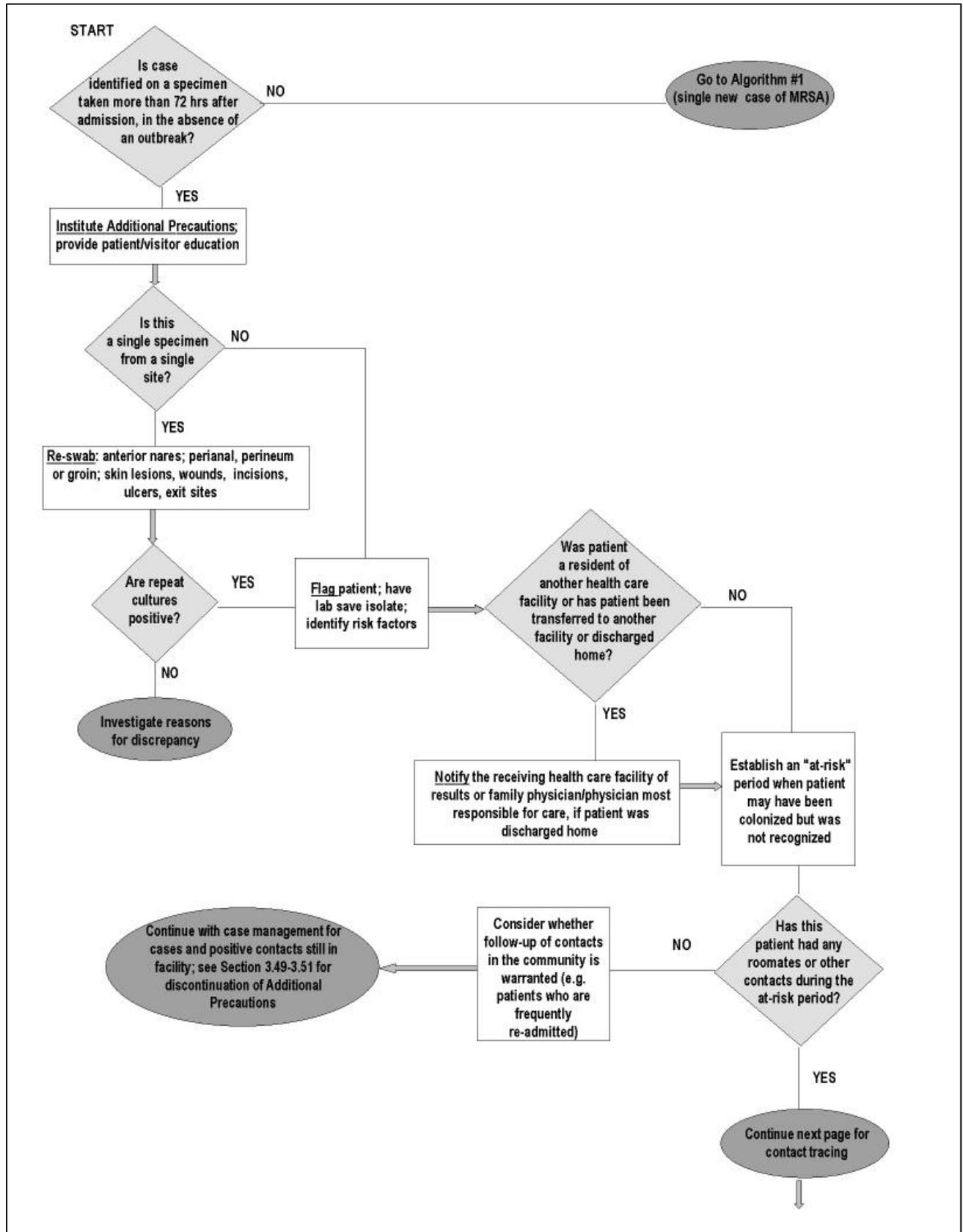
SUSPECTED NOSOCOMIAL MRSA:

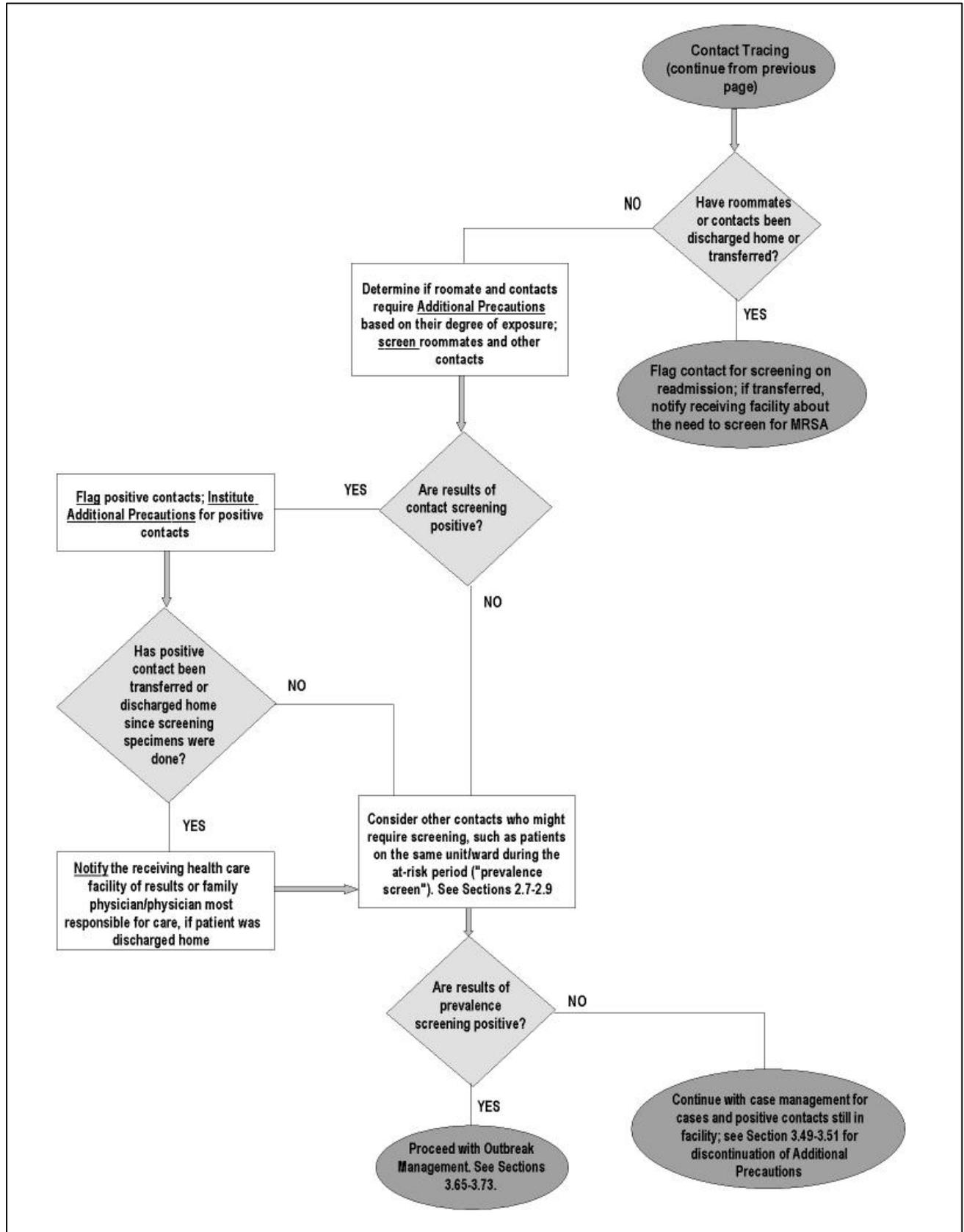
Single MRSA case identified on a clinical specimen or screening specimen taken more than 72 hours after admission, in the absence of a known outbreak

[Refer to Algorithm 2]

1. Institute Contact Precautions/Additional Precautions for patient with MRSA (see Section 3).
2. Provide patient and visitor education (see Section 3.42 and 3.43).
3. If only one specimen at one site is positive in a newly identified case, re-swab the patient (see Section 2.3):
 - a. Mislabelling of specimens may have occurred at the unit/ward level.
 - b. Error can occur at both the pre-analytical and post-analytical stages of laboratory processing.
 - c. Discrepant results may indicate a false-positive. If results of both sets of specimens do not concur, an investigation must be performed to identify the reasons for the discrepancy.
4. Flag patient (see Section 3.57 – 3.59).
5. Have laboratory save the isolate if this is not done routinely for first isolates (see Section 3.63).
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 (see Section 2.5).
7. Assess patient to attempt to identify sources for the MRSA (see Section 2.4):
 - 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/Additional 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):
 1. Flag roommate or contact;
 2. Institute Contact Precautions/Additional Precautions for roommate or contact if this has not been done;
 3. 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”). See Sections 2.7 - 2.9.
 - 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 (see Section 2.9).
 - e. Consider whether follow-up of any contacts in the community is warranted (e.g. patients who are frequently re-admitted).
8. Continue with case management for cases and positive contacts still in facility. See Sections 3.47 - 3.51 for discontinuation of Contact Precautions/Additional Precautions.
9. 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 science centres, Regional Infection Control Networks, public health units that have professional staff certified in infection prevention and control and local infection prevention and 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 Nosocomial MRSA





VRE**VRE PRESENT AT ADMISSION:**

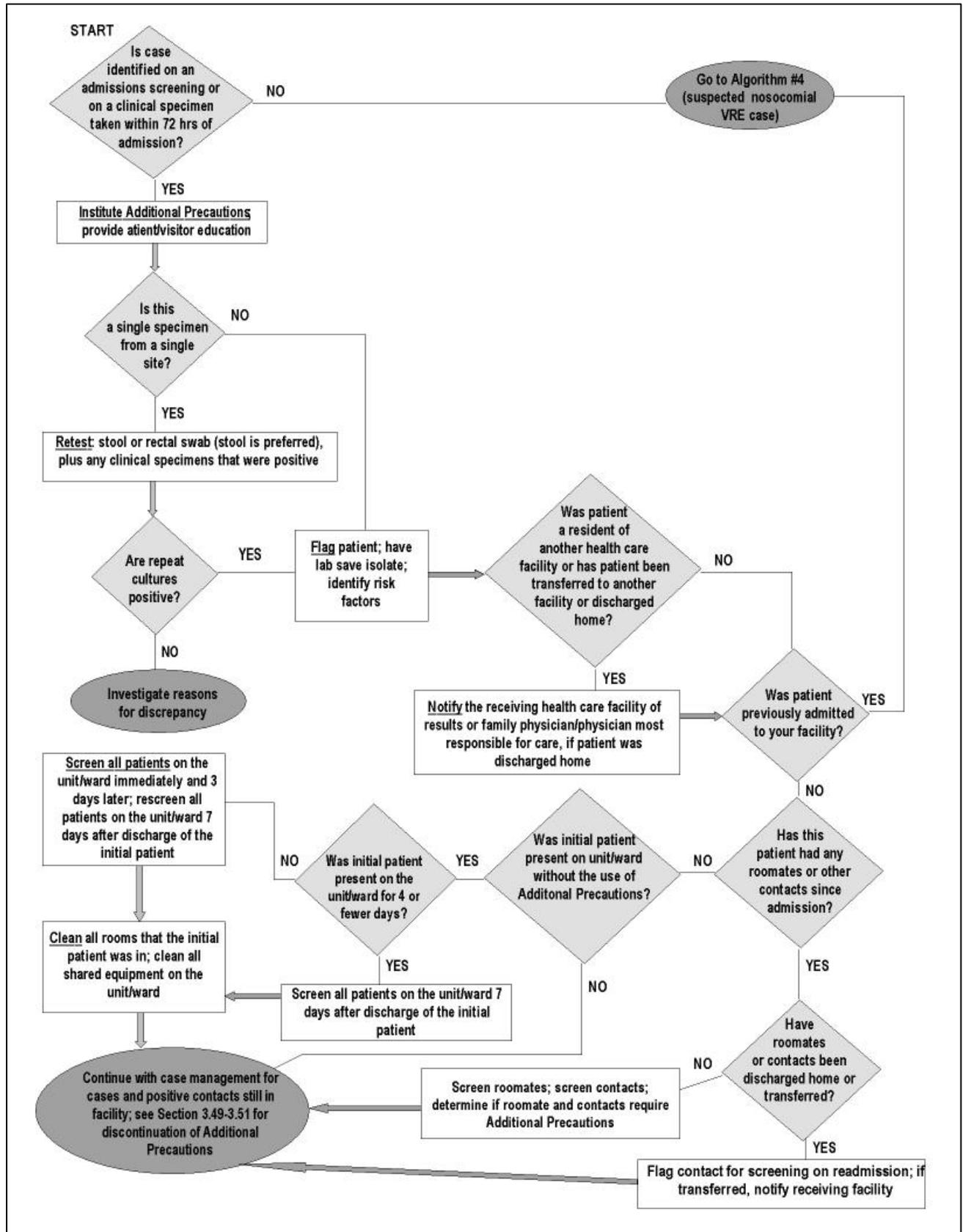
Single VRE case identified on admission screening
OR
Clinical specimen taken within 72 hours of admission

[Refer to Algorithm 3]

1. Institute Contact Precautions/Additional Precautions for patient with VRE (see Section 3).
2. Provide patient and visitor education (see Section 3.42 and 3.43).
3. If only one specimen at one site is positive in a newly identified case, re-swab the patient (see Section 2.3):
 - a. Mislabelling of specimens may have occurred at the unit/ward level.
 - b. Error can occur at both the pre-analytical and post-analytical stages of laboratory processing.
 - c. Discrepant results may indicate a false-positive. If results of both sets of specimens do not concur, an investigation must be performed to identify the reasons for the discrepancy.
4. Flag patient (see Section 3.57 – 3.59).
5. Have laboratory save the isolate if this is not done routinely for first isolates (see Section 3.63).
6. Identify whether patient has risk factors for VRE (see Section 2 and Section 3.6):
 - a. If the patient's risk factor for VRE is a prior admission in your facility, begin an investigation based on the recognition that this may be a nosocomial isolate at your facility (see page 67, "Nosocomial VRE").
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 (see Section 2.5).
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.
 - b. Determine if the roommate or contact requires Contact Precautions/Additional Precautions, based on your facility policies.
 - c. Screen the roommate or contact.
 - d. If results of screening are positive (i.e. additional VRE-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 should be notified of the screening results.
 - iii. If screening results indicate that this may be an outbreak or that there are nosocomial cases, begin an investigation (see page 67, "Nosocomial VRE").
9. **If the patient was present on the unit/ward for 4 or fewer days** during which Contact Precautions/Additional Precautions were not being used:
 - a. Screen all patients on the unit/ward 7 days after discharge of the patient.
 - i. If screening results indicate that there are nosocomial cases or that this may be an outbreak, begin an investigation (see page 67, "Nosocomial VRE").
 - b. Clean all rooms that the patient was in. Refer to Appendix J for VRE cleaning protocol.
 - c. Clean all shared equipment on the unit/ward (e.g. mobile blood pressure cuffs, stretchers, glucometers, oximeters) as well as commonly touched surfaces in main areas (e.g. telephones and keyboards in nursing station, buttons on ice machine). Refer to Appendix J for VRE cleaning protocol.
10. **If the patient was present on the unit/ward for 5 or more days** during which Contact Precautions/Additional Precautions were not being used:
 - a. Screen all patients on the unit/ward on the day the VRE is identified.
 - b. Re-screen all patients on the unit/ward 3 days later.
 - c. Re-screen all patients on the unit/ward 7 days after discharge of the patient.

- d. If screening results indicate that there are nosocomial cases or that this may be an outbreak, begin an investigation (see page 67, “Nosocomial VRE”).
 - e. All rooms the patient was in must be cleaned. Refer to Appendix J for VRE cleaning protocol.
 - f. All shared equipment on the unit/ward requires cleaning (e.g. mobile blood pressure cuffs, stretchers, glucometers, oximeters) as well as commonly touched surfaces in main areas (e.g. telephones and keyboards in nursing station, buttons on ice machine). Refer to Appendix J for VRE cleaning protocol.
11. Continue with case management for cases and positive contacts still in facility. See Sections 3.49 - 3.51 for discontinuation of Contact Precautions/Additional Precautions.

Algorithm 3: Management of a Single New Case of VRE



SUSPECTED NOSOCOMIAL VRE:

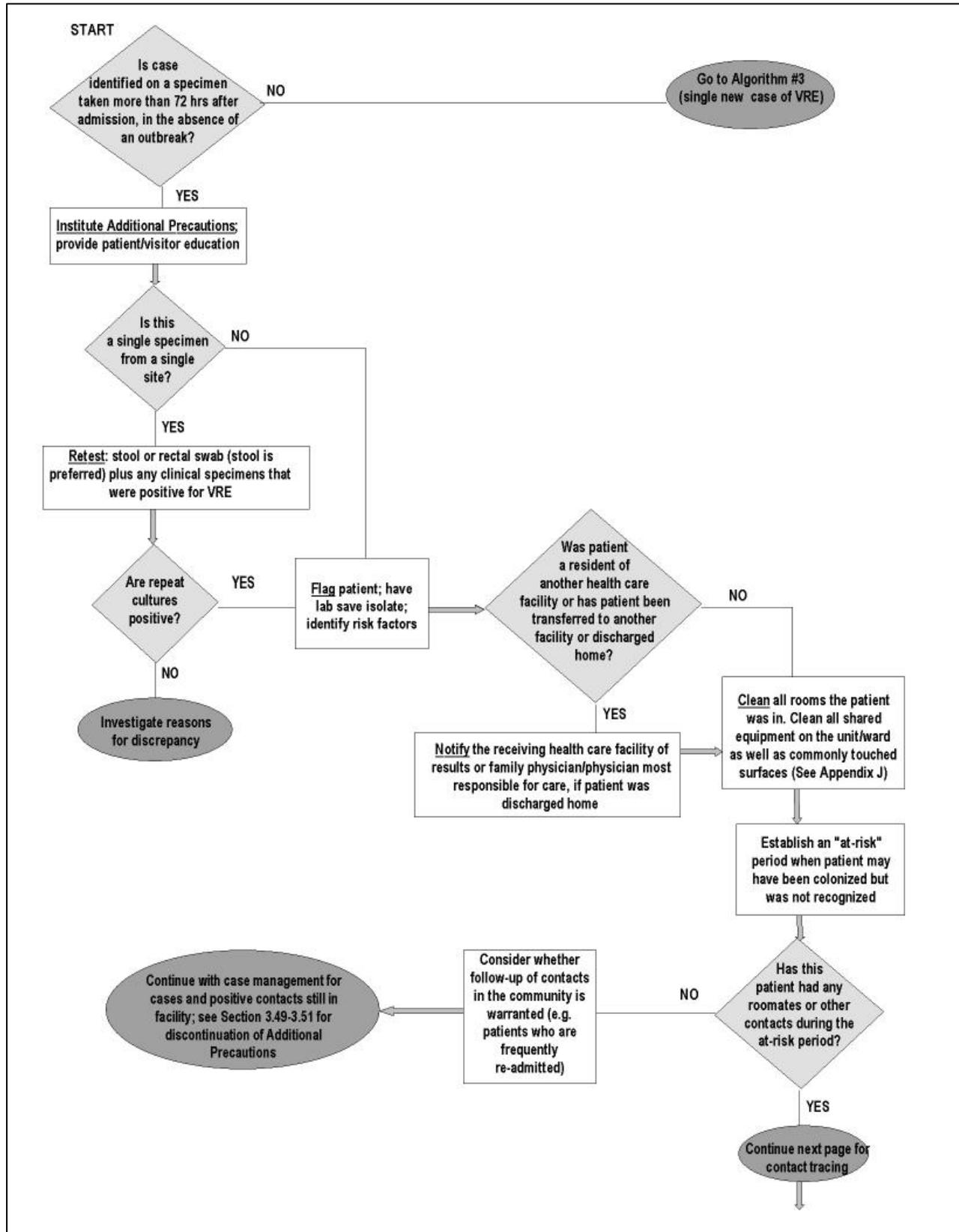
Single VRE case identified on a clinical specimen or screening specimen taken more than 72 hours after admission, in the absence of a known outbreak

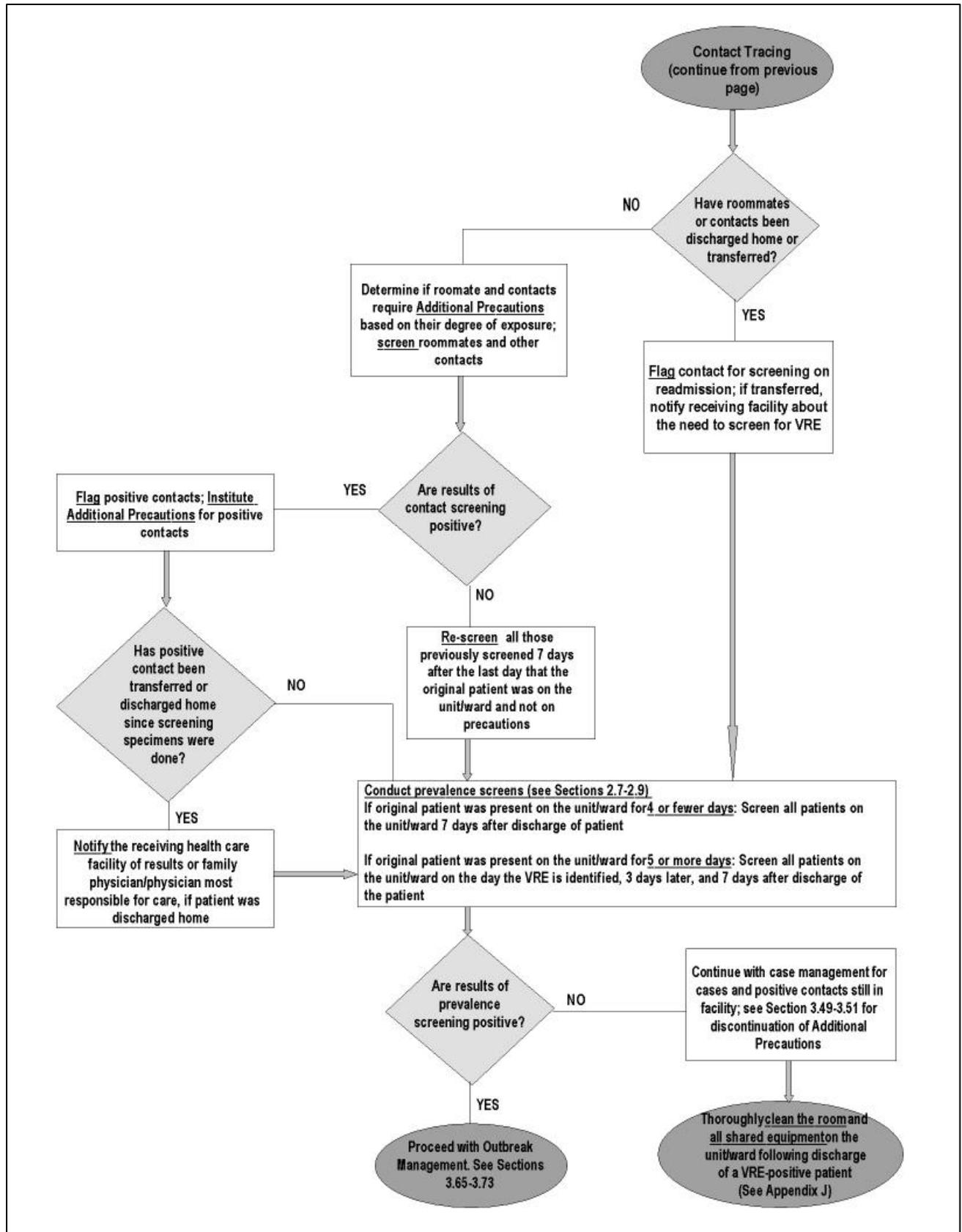
[Refer to Algorithm 4]

1. Institute Contact Precautions/Additional Precautions for patient with VRE (see Section 3).
2. Provide patient and visitor education (see Section 3.42 and 3.43).
3. If only one specimen at one site is positive in a newly identified case, re-swab the patient (see Section 2.3):
 - a. Mislabelling of specimens may have occurred at the unit/ward level.
 - b. Error can occur at both the pre-analytical and post-analytical stages of laboratory processing.
 - c. Discrepant results may indicate a false-positive. If results of both sets of specimens do not concur, an investigation must be performed to identify the reasons for the discrepancy.
4. Flag patient (see Section 3.57 – 3.59).
5. Have laboratory save the isolate if this is not done routinely for first isolates (see Section 3.63).
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 (see Section 2.5).
7. Clean all rooms that the patient was in. Refer to Appendix J for VRE cleaning protocol.
8. Clean all shared equipment on the unit/ward (e.g. mobile blood pressure cuffs, stretchers, glucometers, oximeters) as well as commonly touched surfaces in main areas (e.g. telephones and keyboards in nursing station, buttons on ice machine). Refer to Appendix J for VRE cleaning protocol.
9. **Roommates and Contacts:** assess patient to attempt to identify sources for the VRE (see Section 2.4):
 - 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 all roommates or contacts that this patient has had during the at-risk period:
 - i. Based on their degree of exposure, determine if Contact Precautions/Additional 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 VRE.
 - 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 VRE-positive patients are detected):
 1. Flag roommate or contact;
 2. Institute Contact Precautions/Additional Precautions for roommate or contact if this has not been done;
 3. 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 physician most responsible for care should be notified of the screening results.
 - vi. If results of screening are negative (i.e. no additional VRE-positive patients are detected):
 1. Re-screen all those previously screened (from (iv) above) 7 days after the last day that the original patient was on the unit/ward and not on Contact Precautions/Additional Precautions.
 - c. Consider whether follow-up of any contacts in the community is warranted (e.g. patients who are frequently re-admitted).
10. Conduct prevalence screens (See Sections 2.7 - 2.9):
 - a. **If the patient was present on the unit/ward for 4 or fewer days** during which Contact Precautions/Additional Precautions were not being used:
 - i. Screen all patients on the unit/ward 7 days after discharge of the patient.
 - b. **If the patient was present on the unit/ward for 5 or more days** during which Contact Precautions/Additional Precautions were not being used:

- i. Screen all patients on the unit/ward on the day the VRE is identified, if not already screened as contacts.
 - ii. Re-screen all patients on the unit/ward 3 days later.
 - iii. Re-screen all patients on the unit/ward 7 days after discharge of the patient.
 - c. If analysis of the prevalence screen results for VRE identifies further transmission:
 - i. Continue screening every 3 days until there have been 3 negative results, indicating that there are no further cases of VRE on the unit/ward.
 - ii. Do not permit transfers from the unit/ward to other units/wards or discharges to other facilities except in emergency situations, or if the receiving unit/facility has been notified and can implement Contact Precautions/Additional Precautions and screening as appropriate.
 - iii. Consider closing the unit/ward to new admissions until patients on the unit/ward have been screened and results are known, and cleaning of shared equipment and rooms is complete.
11. Continue with case management for cases and positive contacts still in facility. See Sections 3.49 - 3.51 for discontinuation of Contact Precautions/Additional Precautions.
12. The patient's room must be thoroughly cleaned and disinfected following the patient's discharge. Refer to Appendix J for VRE cleaning protocol.
13. All shared equipment on the unit/ward requires cleaning and disinfection following the patient's discharge (e.g. mobile blood pressure cuffs, stretchers, glucometers, oximeters) as well as commonly touched surfaces in main areas (e.g. telephones and keyboards in nursing station, buttons on ice machine). Refer to Appendix J for VRE cleaning protocol.
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 science centres, regional infection control networks, public health units that have professional staff certified in infection prevention and control and local infection prevention and control associations (e.g. Community and Hospital Infection Control Association – Canada chapters), to develop protocols for effective follow-up of VRE cases.

Algorithm 4: Management of Suspected Nosocomial VRE





Appendix J: Sample Cleaning Checklist for Patient/Resident Room Contaminated with VRE

CHECKLIST FOR DAILY CLEANING:

Use a fresh bucket, cloths and mop head. Always work from the cleanest areas to the dirtiest areas.

- () Walls – check for visible soiling and clean if required
- () Clean all horizontal surfaces and “touched” areas (tables, bed rails, call bells, work surfaces, mattresses/covers, doorknobs, sinks, light fixtures, chairs, phone, TV controls, soap dispensers, toys, electronic games)
- () Clean bathroom, working from sink area to toilet area
- () Clean floors

CHECKLIST FOR DISCHARGE CLEANING (“TERMINAL CLEANING”):

- () Remove all dirty/used items (e.g. suction container, disposable items)
- () Remove curtains before starting to clean the room
- () Discard and replace the following:
 - o Soap
 - o Toilet paper
 - o Alcohol hand rub
 - o Glove box
 - o Sharps container
- () Use clean cloths, mop, supplies and solution to clean the room
- () Fill one bucket of the disinfectant so it is the correct strength
- () Check to see if the mattress, pillows and chairs are torn
- () Report damaged items to your supervisor to have them replaced/repaired
- () Use several cloths to clean a room. Use each cloth one time only, do not dip a cloth back into disinfectant solution after use and re-use on another surface. **THERE IS TO BE NO REUSE OF USED CLOTHS.**
- () Always work from top to bottom
- () Clean all surfaces and allow for the appropriate contact time with the disinfectant:
 - o Mattress
 - o Pillow
 - o BP cuff
 - o Bedrails and bed controls
 - o Call bell
 - o Stethoscope and column
 - o Flow meters
 - o Suction tube and outer container
 - o Pull cord in washroom
 - o Overbed table
 - o Inside drawers
 - o TV controls
 - o Soap dispenser
 - o Door handles
 - o Light switches
 - o Light cord
 - o Chair
 - o Phone
 - o Toys (paediatrics)
 - o Electronic games (paediatrics)
- () Clean the following (and any other items that might be used on another patient) thoroughly before being used by another patient
 - o Commodes/high toilet seat
 - o Wheelchairs
 - o Monitors
 - o IV poles
- () Replace the sharps container when it is 2/3 full
- () Clean the outer canister of the suction container and red tubing
- () Remove all tape from the surfaces
- () Wash the sheepskin between patients
- () Wash the lift mesh or sheet between patients

Appendix K: Sample Protocol for Transporting Patients on Contact Precautions

Transporting a patient on Contact Precautions (one-person transfer, patient in wheel chair or stretcher):

- Check with unit clerk that receiving area is aware of appropriate precautions
- **PERFORM HAND HYGIENE**
- Don appropriate PPE prior to entering patient's room
- Place clean sheet over stretcher or wheel chair as instructed
- Assist patient to stretcher /wheel chair
- Use hospital grade disinfectant to wipe area on wheel chair or stretcher that will provide a clean area for your hands
- Assist patient to perform hand hygiene with alcohol-based hand rub
- Remove gown and gloves; a clean pair of gloves may be brought in case assistance is required during the transfer
- **PERFORM HAND HYGIENE**
- Place a clean sheet over the patient
- Transport patient
- Ensure that receiving area is aware that patient has arrived
- Equipment used to transport the patient must be cleaned when the transport is complete

Appendix L: Sample Letters for Physicians

Adapted from Mount Sinai Hospital

Letter #1: Contact of a positive patient who has been discharged home before screening tests were done

[Insert date]

Dr. [insert physician name]

[insert address line 1]

[insert address line 2]

Dear Dr. [insert physician last name],

RE: [insert patient name]

DOB: [insert patient's date of birth]

While in [insert name of facility], your above named patient was in the same room with another patient who has since been found to be colonized with methicillin-resistant *Staphylococcus aureus* (MRSA). As I am sure you are aware, MRSA is resistant to all penicillins and cephalosporins.

Because *Staphylococcus aureus* can cause serious nosocomial infections, we want to make sure that no acquisition with a resistant strain has occurred. Although the risk is low, *Staphylococcus aureus* can be transmitted from person-to-person by direct or indirect contact on the same ward. In order to be sure that your patient is not affected, we are requesting that [he/she] have swabs of the anterior nares, perianal area and any open wounds collected, looking for MRSA only (please indicate this specifically on lab requisition).

We would be grateful if you would arrange that a copy of the results of these specimens be faxed to [insert name of Infection Prevention & Control Professional or Physician], at [insert fax number of Infection Prevention & Control Professional or Physician].

In the unlikely event that your patient has acquired this organism please contact the infection prevention and control department at [insert phone number] and we would be willing to discuss with you our strategy for management of MRSA. If you have any questions or comments, please call us at any time.

Thank you very much for your assistance and co-operation in this matter.

Sincerely,

[insert name of Infection Prevention & Control Professional or Physician]

[insert title of Infection Prevention & Control Professional or Physician]

[insert address line 1]

[insert address line 2]

[insert phone number]

Appendix L: Sample Letters for Physicians, con't.

Adapted from Mount Sinai Hospital

Letter #2: Positive patient who has been discharged home before results of screening tests are known

[Insert date]

Dr. [insert physician name]
[insert address line 1]
[insert address line 2]

Dear Dr. [insert physician last name],

RE: [insert patient name]
DOB: [insert patient's date of birth]

[Insert patient name] was recently a patient at [insert facility name], and was discharged on [insert date of discharge]. Specimens collected prior to discharge have subsequently shown that this patient is colonized in the [insert specimen site] with methicillin-resistant *Staphylococcus aureus* (MRSA). There is a small risk that [he/she] might develop an infection due to MRSA or transmit the organism to another patient. Therefore, it is important that, if this patient needs to be admitted to any health care facility, that facility is notified and precautions be used to interrupt transmission. When you see [him/her] in your office, it is recommended that, in addition to Routine Practices, you should wear gloves and a long-sleeved gown for direct care to prevent transmission.

The MRSA positive results should not interfere in [insert patient name]'s ability to carry out activities of normal daily living. Good hand hygiene, as always, is recommended.

Thank you for your help and co-operation. Please do not hesitate to contact us if you have any additional questions or concerns.

Sincerely,

[insert name of Infection Prevention & Control Professional or Physician]

[insert title of Infection Prevention & Control Professional or Physician]
[insert address line 1]
[insert address line 2]
[insert phone number]

Appendix M: Resources for Infection Prevention and Control

Organizations and Publications

Canadian Committee on Antibiotic Resistance (CCAR)

The Canadian Committee on Antibiotic Resistance coordinates activities and information for health care professionals, patients, the general public regarding microbial resistance to antibiotic medicines and responsible use of antibiotics.

Web address: <http://www.ccar-ccra.com/>

Hopisafe.ca: A New Approach to Prevent Infections in Hospitals

This website outlines the innovative campaign carried in University of Geneva Hospitals to improve hand hygiene and decrease nosocomial rates of MRSA.

Web address: <http://www.hopisaffe.ch/>

Provincial Infectious Diseases Advisory Committee (PIDAC)

PIDAC was established by the Ontario Ministry of Health and Long-term Care and provides advice on protocols to prevent and control infectious diseases, emergency preparedness for an infectious disease outbreak, and immunization programs. Best practice guidelines for Ontario health care settings are published on this site.

Web address: http://www.health.gov.on.ca/english/providers/program/infectious/pidac/pidac_mn.html

PubMed

PubMed is the National Library of Medicine's search service that provides access to over 15 million citations in biomedical and life sciences journals.

Web address: <http://www.pubmed.com>

Public Health Agency of Canada (PHAC)

Public Health Agency of Canada. Guidelines – Infectious Diseases. Infection Control Guidelines – Hand Washing, Cleaning, Disinfection and Sterilization in Health Care.

Web address: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/98pdf/cdr24s8e.pdf>

Public Health Agency of Canada. Guidelines – Infectious Diseases. Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care – Revisions of Isolation and Precaution Techniques, 1999.

Web Address: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/>

Public Health Agency of Canada. Guidelines – Infectious Diseases. Preventing the Spread of Vancomycin-Resistant *Enterococci* (VRE) in Canada, 1999.

Web address: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/97vol23/23s8/vreindx.html>

U.S. Centers for Disease Control and Prevention (CDC)

Infection Control Guidelines.

Web address: <http://www.cdc.gov/ncidod/dhqp/index.html>

Wipe It Out: Royal College of Nursing (UK) Campaign on MRSA

Web address: <http://www.rcn.org.uk/resources/mrsa/>

World Health Organization: Clean Care is Safer Care

Web address: http://www.who.int/patientsafety/events/05/global_challenge/en/index.html

Professional Associations

Association for Professionals in Infection Control and Epidemiology (APIC) - U.S.

Association for Professionals in Infection Control and Epidemiology (APIC). APIC Text of Infection Control and Epidemiology, 2005 Edition. Available for purchase from [APIC online store](#).

Web address: <http://www.apic.org/AM/Template.cfm?Section=Store>

Community and Hospital Infection Control Association – Canada (CHICA-Canada)

National association for infection control professionals in Canada. Offers a number of Position Statements and expertise in infection prevention and control.

Web address: <http://www.chica.org>

The College of Physicians and Surgeons of Ontario

Infection Control in Physician's Office, 2004.

Web address: <http://www.cpso.on.ca/Publications/infectioncontrolv2.pdf>

Ontario Hospital Association (OHA)

Communicable Diseases Surveillance Protocols for Occupational Health.

Web address:

http://www.oha.com/client/OHA/OHA_LP4W_LND_WebStation.nsf/page/Communicable+Diseases+Surveillance+Protocols

Society for Healthcare Epidemiology of America (SHEA)

SHEA Guideline for Preventing Nosocomial Transmission of Multidrug-Resistant Strains of *Staphylococcus aureus* and Enterococcus.

Web Address: http://www.shea-online.org/Assets/files/position_papers/SHEA_MRSA_VRE.PDF

Guidelines for the prevention of antimicrobial resistance in hospitals.

Web address: http://www.shea-online.org/Assets/files/position_papers/AntimicroResist97.pdf

Dutch Working Party

Policy for Methicillin-resistant *Staphylococcus aureus*.

Web address: <http://www.wip.nl/UK/contentbrowser/onderwerpsort.asp> (select Hospitals, then MRSA)

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