

Nebraska Summary of  
Guidelines  
for the  
Management of Patients with  
MiDrug-Resistant Organisms  
(MDROs)

Health Care Settings  
Community Settings

July 2010



## Purpose

This manual was created to provide a concise, practical guide to control the evolving problem of antibiotic resistance in a variety of health care and community settings where resistant pathogens may be encountered.

## Mission

The mission of the MultiDrug-Resistant Organisms (MDRO) Task Force is to reduce the emergence and spread of antibiotic resistance in the state of Nebraska through education aimed at promoting and enhancing infection prevention and control.

## Vision

The patients/residents/clients of healthcare facilities in Nebraska will receive the highest quality care regardless of the identification or presence of antibiotic resistant organisms. Effective communication of the patient's colonization or infection history is a key to preventing further spread of resistant organisms to meet this vision. An [Inter-facility Infection Control Transfer Form](#) is an effective way to communicate this information. (CDC, 2010).

## Acknowledgements

This document was produced by the Association for Professional in Infection Control and Epidemiology (APIC) - Greater Omaha Chapter MDRO Task Force. The format was inspired by a similar document prepared through a collaborative effort between Pierce County (Washington) Antibiotic Resistance Task Force and Tacoma-Pierce County (Washington) Health Department and some of the material is taken verbatim with permission. The Greater Omaha APIC Chapter extends sincere gratitude to this organization for permission to use their material. We gratefully acknowledge the support and input from the all of the infection professionals that worked on this document.

## Disclaimer

Having reviewed existing literature and previously published guidelines, it is the consensus of the APIC - Greater Omaha MDRO Task Force that the guidelines in this manual are effective and practical recommendations for controlling antibiotic resistance. **However, these guidelines are intended as a reference and not a substitute for professional judgment. When in doubt, consult with the Centers for Disease Control and Prevention (CDC) or other authoritative infection control parties and references.** If you have questions or comments contact your state or local health department or the APIC – Greater Omaha Chapter at [www.goapic.org](http://www.goapic.org)

## 2010 Nebraska Guideline Update

This updated document addressing MDRO has been reviewed by members of the APIC - Greater Omaha Chapter in cooperation with the Nebraska Department of Health and Human Services (DHHS). Additional review and input was provided by infectious disease physicians and other health care professionals, in both rural and urban areas.

Due to scientific advances and best practice, this document replaces the previous written document – [Guidelines for Management of Patients with Multidrug-Resistant Organisms \(MDROs\) for Nebraska Hospitals, Long-term Care Facilities, and Medical Care Facilities January 2005](#). This revised document includes current CDC updates regarding MDROs. The task force envisions that the use of these best practice recommendations will standardize care and improve communication across the continuum of patient care. The guidelines are available online at [Antimicrobial Resistance Surveillance \(ARS\) in Nebraska](#) (Nebraska DHHS, 2010) and [APIC Greater Omaha Chapter Documents](#). (APIC - Greater Omaha, 2010).

This document specifically references two documents from the Centers for Disease Control and Prevention (CDC): “[Management of Multidrug-Resistant Organisms in Healthcare Settings 2006](#)” (CDC MDRO Guide - Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L., 2006) and “[Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Health care Settings 2007](#)” (CDC Isolation Guide, Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L., 2007). Along with others that have hyperlinks included. Updates will be made July 7<sup>th</sup> of each year as necessary.

The care of patients with MDROs in the health care environment can be very confusing. These guidelines are designed to provide the Infection Preventionist (IP) and their facilities with an educational resource to develop/revise their institutional policies. This document provides basic measures to outline best practices at this time. Institutions may implement more stringent control measures as directed by their Infection Control and Prevention Committees. Decisions and practices related to MDROs should be founded on scientific evidence to prevent unnecessary fear, anxiety and overreaction. Communication is essential in early treatment, identification of risk factors and promotion of infection control and prevention precautions in both the transferring and receiving institution. Denying admission in to a health care facility is neither necessary nor reasonable for a patient with an MDRO diagnosis. Refusal to accept patients on the basis of an infectious status may be in violation of the Americans with Disabilities Act. It is also not an acceptable practice to transfer a patient with a known MDRO without notifying the receiving facility. Appendix 11 is just one example of an effective [Inter-facility Infection Control Transfer Form](#). (CDC Transfer Form, 2010)

Tom Safranek, M.D., DHHS – Public Health, State Medical Epidemiologist

Jude Dean, M.S., R.N., B.S.N., DHHS – Public Health, Epidemiology Surveillance Coordinator

Todd Falter, M.P.A., R.N., B.S.N., DHHS – Lincoln Regional Center, Interim Director of Risk Management and Infection Control

# How to Use This Manual

This manual is organized by practice setting to enable the user to read specific sections without having to read the entire manual.

All providers are urged to become familiar with the following six sections that are marked with an Asterisk (\*) in the Table of Contents:

1. 2010 Nebraska Guideline Update\*
2. Epidemiology of Antibiotic Resistant Organisms\*
3. Hand Hygiene\*
4. Precautions – Standard & Transmission Based: Contact\*
5. Environmental\*
6. Your Practice Setting

**All providers should locate their practice setting in the Table of Contents and read the section pertaining to their setting.**

If your specific practice setting is not listed, there may be a setting that is similar enough so the same principles apply.

This document is available at:

- APIC Greater Omaha Chapter website, [www.goapic.org](http://www.goapic.org)
- Nebraska DHHS Website, [www.dhhs.ne.gov](http://www.dhhs.ne.gov)

# Table of Contents

Purpose, Mission, Acknowledgements, and Disclaimer .....	2
*2010 Nebraska Guideline Update .....	3
How to Use this Manual .....	4
Table of Contents .....	5
Acronyms .....	7
Glossary .....	8
*Epidemiology of Multidrug-Resistant Organisms .....	14
Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) .....	16
Community Associated–Methicillin-resistant <i>Staphylococcus aureus</i> (CA-MRSA) ..	20
Vancomycin Intermediate/Resistant <i>Staphylococcus aureus</i> (VISA/VRSA) .....	21
Vancomycin-Resistant <i>Enterococci</i> (VRE) .....	22
<i>Clostridium difficile</i> ( <i>C. difficile</i> ) .....	24
*Hand Hygiene .....	29
*Precautions to Prevent Transmission of MDROs:	
Standard Precautions to Prevent Transmission of MDROs .....	34
Transmission-based: Contact Precautions to Prevent Transmission of MDROs .....	35
Discontinuing Contact Precautions .....	36
Laboratory:	
Laboratory Detection.....	40
Laboratory Workup .....	41
Culturing of Health care Workers, Patients and the Environment.....	45
Outbreak Management .....	47
*Environmental (Housekeeping) Practices and Equipment.....	52
*Practice Setting:	
Acute Care Setting.....	56
Long-term Care Setting.....	63
Rehabilitation Setting.....	68
Mental Health Setting.....	73
Outpatient Clinic / Ambulatory Care Setting.....	76
Outpatient Dialysis Setting.....	80
Home Health / Hospice Setting.....	84
Correctional Setting .....	87
Nebraska Guidelines Introduction for School, Athletic and Child Care Settings .....	89
School Setting .....	91
Athletic Setting.....	94
Child Care Setting .....	97
Veterinary Setting .....	100
Animals in Healthcare Settings.....	104
References.....	108

\* All providers are urged to become familiar with the six sections with an Asterisk (\*).

Appendix 1 – “Living with MRSA” English Document with Links .....	115
Appendix 2 – “Living with VRE” English .....	135
Appendix 3a – Hand Washing Poster English/Spanish .....	138
Appendix 3b – Hand Rub / Hand Washing Poster English .....	139
Appendix 4 – Application of Standard Precautions .....	140
Appendix 5 – Standard – Contact Precautions Table .....	141
Appendix 6 – Personal Protection Equipment.....	144
Appendix 7 - Roommate Selection Checklist .....	146
Appendix 8 – Behavioral Health Checklist .....	147
Appendix 9 – CDC Tier 1 Approach.....	148
Appendix 10 – CDC Tier 2 Approach.....	149
Appendix 11 – CDC Inter-facility Infection Control Transfer Form.....	150

# Acronyms

<b>ACIP</b>	Advisory Committee on Immunization Practices
<b>ADA</b>	Americans with Disabilities Act
<b>APIC</b>	Association of Professionals in Infection Control and Epidemiology
<b>CDC</b>	Centers for Disease Control and Prevention
<b>CDI</b>	<i>Clostridium difficile</i> Infection
<b>CA-MRSA</b>	Community Associated Methicillin-Resistant <i>Staphylococcus aureus</i>
<b>CLSI</b>	Clinical and Laboratory Standards Institute
<b>DHHS</b>	Department of Health and Human Services
<b>DRSP</b>	Drug-Resistant <i>Streptococcus pneumoniae</i>
<b>EPA</b>	Environmental Protection Agency
<b>HICPAC</b>	Healthcare Infection Control Practices Advisory Committee
<b>IOSA</b>	IATA Operational Safety Audit
<b>LTC</b>	Long Term Care
<b>MDRO</b>	Multidrug-Resistant Organism
<b>MRSA</b>	Methicillin-Resistant <i>Staphylococcus aureus</i>
<b>MSSA</b>	Methicillin-Susceptible <i>Staphylococcus aureus</i>
<b>NHDS</b>	National Hospital Discharge Survey
<b>OSHA</b>	Occupational Safety and Health Administration
<b>SHEA</b>	Society for Healthcare Epidemiology of America
<b>VISA</b>	Vancomycin-Intermediate <i>Staphylococcus aureus</i>
<b>VRE</b>	Vancomycin-Resistant <i>Enterococcus</i>
<b>VRSA</b>	Vancomycin-Resistant <i>Staphylococcus aureus</i>

# Glossary

## **Chain of Infection:**

Process by which a microorganism (germ) is transmitted and can cause illness. Links in the chain of infection include:

Infectious Agent – microorganism that can cause disease, such as viruses, bacteria, and fungi.

Reservoir – location where the infectious agent grows and multiplies, such as in people, animals, water, or soil.

Portal of Exit – site from which the infectious agent escapes from its reservoir, such as secretions, excretions, skin, droplets, and body fluids.

Means of Transmission – method by which the infectious agent is transferred to a person or animal, such as by direct contact, ingestion, insects, or through the air.

Portal of Entry – site on a person or animal where the infectious agent can enter the body, such as through mucous membranes, respiratory tract, broken skin, gastrointestinal tract, or urinary tract.

Susceptible Host – a person or animal at risk for infection, such as one with immune system dysfunction, diabetes, surgery, burns, multiple hospitalizations, or prior use of broad-spectrum antibiotics.

## **Carrier:**

A person who is colonized with a pathogen. The organism may be present in the nares, sputum, urine, an open wound, in the stool or on the skin without clinical manifestations of disease. A carrier can transmit the organism to another person through direct contact, (usually hand contact) and indirect contact (e.g., call lights, door handles, telephones, etc.).

## **Cleaning:**

Removal of all foreign material (e.g., soil, organic material) from objects which is accomplished with water, mechanical action, and detergents or enzymatic products. Failure to remove foreign matter from an object before the disinfection process is likely to render the disinfection process ineffective.

## **Cohorting:**

The practice of grouping patients/residents/clients infected or colonized with the same infectious agent together to confine their care to one area and prevent contact with susceptible patients (cohorting patients). During outbreaks, healthcare personnel may be assigned to a cohort of patients to further limit opportunities for transmission (cohorting staff).

## **Colonization:**

Proliferation of microorganisms on or within body sites without detectable host immune response, cellular damage, or clinical expression. The presence of a microorganism within a host may occur with varying duration, but may become a source of potential transmission. In many instances, colonization and carriage are synonymous.



**Contact Precautions:**

Contact precautions are intended to prevent transmission of infectious agents, including epidemiologically important microorganisms, which are spread by direct or indirect contact with the patient or the patient's environment.

**Contamination:**

The presence of microorganisms on inanimate objects (e.g., clothing, surgical instruments, environmental surfaces) or in substances (e.g., water, food, milk).

**Decolonization:**

Elimination of the carrier state through the use of antimicrobial agents. This decreases the risk of transmission to others, especially immunocompromised or highly susceptible individuals.

**Disinfection:**

A process that eliminates many or all microorganisms, except bacterial spores.

**Endemic:**

A disease present in a community at all times.

**Enterococcus:**

A group of bacteria normally found in the digestive tract. Two common types of enterococci -- *Enterococcus faecalis* and *Enterococcus faecium* -- occasionally cause human disease, most commonly in the urinary tract and wounds.

**Eradication:**

Elimination of infections and/or colonization of pathogens in a healthcare facility through the implementation of infection control and/or antimicrobial agents.

**Hand Hygiene:**

A general term that applies to any one of the following: 1) handwashing with plain (non-antimicrobial) soap and water; 2) antiseptic handwash (soap containing antiseptic agents and water); 3) antiseptic handrub (waterless antiseptic product, most often alcohol-based, rubbed on all surfaces of hands); or 4) surgical hand antisepsis (antiseptic handwash or antiseptic handrub performed preoperatively by surgical personnel to eliminate transient hand flora and reduce resident hand flora).

**Healthcare Associated infection (HAI):**

Healthcare-associated infections are infections that patients acquire during the course of receiving treatment for other conditions within a health care setting (e.g., acute care hospital, chronic care facility, ambulatory clinic, dialysis center, surgical center, home) and is related to receiving health care (i.e., it was not already incubating or present at the time healthcare was provided). In ambulatory and home settings, HAI would apply to any infection that is associated with a medical or surgical intervention. Since the geographic location of infection acquisition is often uncertain, the preferred term is considered to be healthcare-associated rather than healthcare-acquired.

**Healthcare Personnel, Healthcare Worker (HCW):**

All paid and unpaid persons who work in a health care setting (e.g., any person who has professional or technical training in a health care-related field and provides patient care in a health care setting or any person who provides services that support the delivery of health care such as dietary, housekeeping, engineering, maintenance personnel).

**Infection:**

The transmission of microorganisms into a host after evading or overcoming defense mechanisms, resulting in the organism's proliferation and invasion within host tissue(s). Host responses to infection may include clinical symptoms or may be subclinical, with manifestations of disease mediated by direct organisms pathogenesis and/or a function of cell-mediated or antibody responses that result in the destruction of host tissues.

**Infection Preventionist (IP):**

A person whose primary training is in either nursing, medical technology, microbiology, or epidemiology and who has acquired special training in infection control.

Responsibilities may include collection, analysis, and feedback of infection data and trends to health care providers; consultation on infection risk assessment, prevention and control strategies; performance of education and training activities; implementation of evidence-based infection control practices or those mandated by regulatory and licensing agencies; application of epidemiologic principles to improve patient outcomes; participation in planning renovation and construction projects (e.g., to ensure appropriate containment of construction dust); evaluation of new products or procedures on patient outcomes; oversight of employee health services related to infection prevention; implementation of preparedness plans; communication within the health care setting, with local and state health departments, and with the community at large concerning infection control issues; and participation in research. Certification in infection control (CIC) is available through the Certification Board of Infection Control and Epidemiology.

**Infection Control and Prevention Program:**

A multidisciplinary program that includes a group of activities to ensure that recommended practices for the prevention of health care-associated infections are implemented and followed by HCWs, making the health care setting safer for patients and health care personnel. The Joint Commission requires the following five components of an infection control program for accreditation: 1) *Surveillance*: monitoring patients and health care personnel for acquisition of infection and/or colonization; 2) *Investigation*: identification and analysis of infection problems or undesirable trends; 3) *Prevention*: implementation of measures to prevent transmission of infectious agents and to reduce risks for device- and procedure-related infections; 4) *Control*: evaluation and management of outbreaks; and 5) *Reporting*: provision of information to external agencies as required by state and federal law and regulation ([www.jointcommission.org](http://www.jointcommission.org)). The infection control program staff has the ultimate authority to determine infection control policies for a health care organization with the approval of the organization's governing body.

**Intermediate-level Disinfection:**

Use of a cleaning agent that inactivates *Mycobacterium tuberculosis*, gram-negative bacteria, most viruses and fungi, but does not kill bacterial spores.

**Low-level Disinfection:**

Use of a cleaning agent that can kill most bacteria, some viruses, and some fungi. It cannot be relied on to kill resistant microorganisms, such as tubercle bacilli or bacterial spores.

**Multidrug-Resistant Organisms (MDROs):**

In general, bacteria (excluding *M. tuberculosis*) that are resistant to one or more classes of antimicrobial agents and usually are resistant to all but one or two commercially available antimicrobial agents (e.g., MRSA, VRE, extended spectrum beta-lactamase [ESBL]-producing or intrinsically resistant gram-negative bacilli).

**Nosocomial:**

A term used interchangeably with HAI to denote a new disease or condition acquired within a health care setting.

**Outbreak/Epidemic:**

The occurrence of infection higher than normally expected.

**Pathogen:**

A disease producing microorganism.

**Personal Protective Equipment (PPE):**

A variety of barriers used alone or in combination to protect mucous membranes, skin, and clothing from contact with infectious agents. PPE includes gloves, masks, respirators, goggles, face shields, and gowns.

**Respiratory Hygiene / Cough Etiquette:**

The elements of Respiratory Hygiene / Cough Etiquette include:

1. Education of health care facility staff, patients, and visitors;
2. Posted signs, in language(s) appropriate to the population served, with instructions to patients and accompanying family members or friends;
3. Source control measures (e.g., covering the mouth/nose with a tissue when coughing and prompt disposal of used tissues, using surgical masks on the coughing person when tolerated and appropriate);
4. Hand hygiene after contact with respiratory secretions; and
5. Spatial separation, ideally >3 feet, of persons with respiratory infections in common waiting areas when possible. Covering sneezes and coughs and placing masks on coughing patients are proven means of source containment that prevent infected persons from dispersing respiratory secretions into the air.

**Staphylococcus:**

A group of bacteria, commonly known as Staph. It can cause a multitude of diseases as a result of infection of various tissues of the body. Staph bacteria can cause illness not only directly by infection (such as in the skin), but also indirectly by producing toxins responsible for food poisoning and toxic shock syndrome. Staph-related illness can range from mild and requiring no treatment to severe and potentially fatal.

**Standard Precautions:**

A group of infection prevention practices that apply to all patients, regardless of suspected or confirmed diagnosis or presumed infection status. Standard Precautions are a combination and expansion of Universal Precautions and Body Substance Isolation. Standard Precautions is based on the principle that all blood, body fluids, secretions, excretions except sweat, non-intact skin, and mucous membranes may contain transmissible infectious agents. Standard Precautions includes hand hygiene, and depending on the anticipated exposure, use of gloves, gown, mask, eye protection, or face shield. Also, equipment or items in the patient environment likely to have been contaminated with infectious fluids must be handled in a manner to prevent transmission of infectious agents, (e.g., wear gloves for handling, contain heavily soiled equipment, properly clean and disinfect or sterilize reusable equipment before use on another patient).

**Transmission-Based Precautions:**

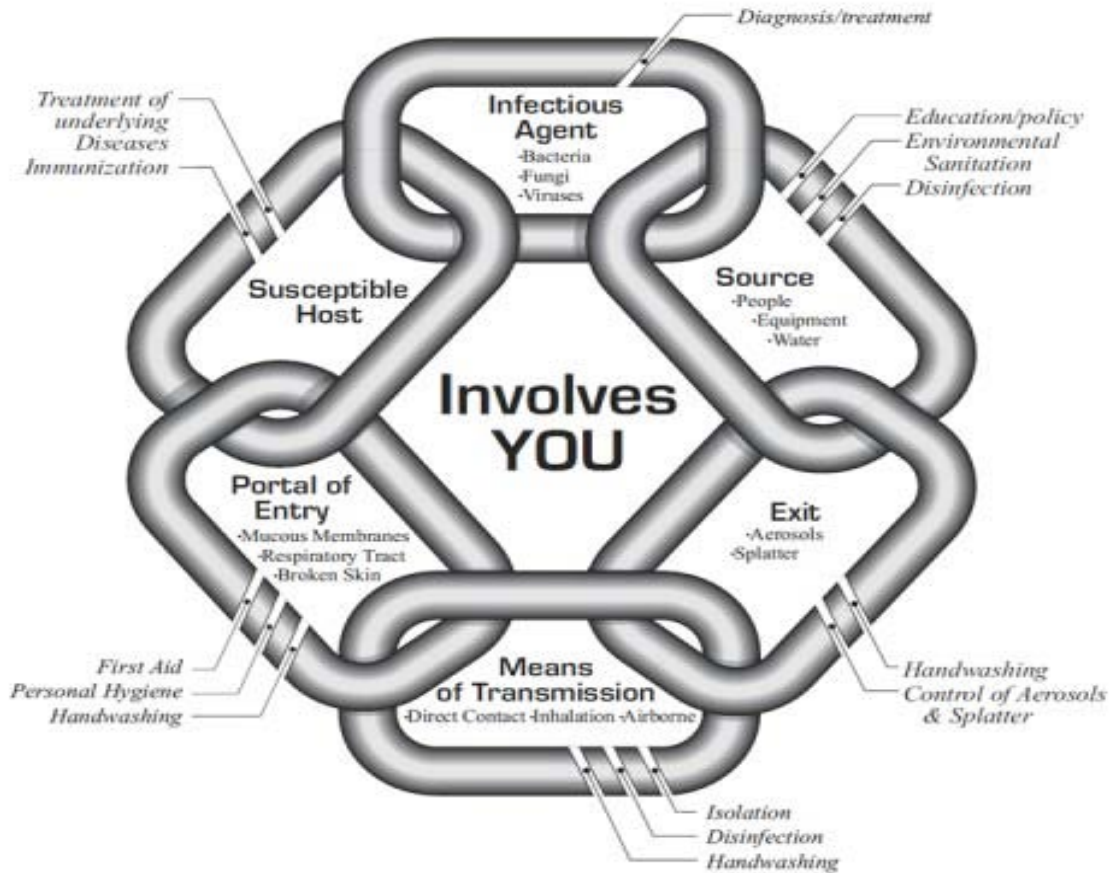
There are three categories of Transmission-Based Precautions: Contact Precautions, Droplet Precautions, and Airborne Precautions. Contact precautions are used when the route(s) of transmission is (are) not completely interrupted using Standard Precautions alone. For some diseases that have multiple routes of transmission (e.g., SARS), more than one Transmission-Based Precautions category may be used. When used alone or in combination, they are always used in addition to Standard Precautions.

## **Acronyms and Glossary Updates**

This page intentionally left blank for future updates.

# Epidemiology of Multidrug-Resistant Organisms (MDROs)

The Chain of Infection is illustrated below:



To have an infection there must be an infectious agent. The infectious agent is the pathogen (germ), such as a virus, bacterium, protozoa, fungi or rickettsiae. Secondly, the germ must have a place to live or hideout. In other words, it must have a home.

This is the reservoir. Reservoirs are animals, insects, humans, objects, surfaces, equipment or virtually everything in the environment including food, water and even the air we breathe. Third, pathogens require a means to leave its reservoir. This is called a portal of exit or means to escape the host reservoir. Pathogens exit the human body through blood, semen, vaginal secretions, breast milk, tears, urine, feces, mucous discharge, drainage from open wounds and across the placental barrier among others.

Once the pathogen leaves the reservoir, it must be transmitted to its next host. This is the **means of transmission**, mode of transmission, method of transmission or route of transmission. There are multiple routes for pathogens to be transmitted. The most common and frequent means of transmission is contact transmission, which is divided into three subgroups: direct contact, indirect contact and droplet contact.

A **portal of entry** or a means of entering a new reservoir or host is essential. Germs can enter the body through breaks in the skin, through the mucous membranes of the eyes, mouth or nose, through the digestive tract, by consuming contaminated food, through the urinary and reproductive tracts, through sex, the respiratory system by breathing in contaminated air, and the circulatory system through breaks in the skin. If the host's defenses are strong, they may thwart the pathogen's invasion; otherwise, they become a **susceptible host** unable to fight off the pathogen. Factors such as age, genetics, nutritional status, personal hygiene, stress levels and overall health may significantly contribute to a person's susceptibility to a pathogenic organism.

Infection prevention is based on trying to break this chain so an infection does not occur. Means of transmission is one area where the chain can be broken. If Standard and Expanded Precautions are used appropriately, the Chain of Infection can be broken.

## Methicillin-resistant *Staphylococcus aureus* (MRSA)

*Staphylococcus aureus* (*S. aureus*), a gram-positive cocci, is distinguished in the laboratory setting by its tendency to form grape-like clusters under microscopic examination and positive coagulase testing. It grows rapidly under either aerobic (oxygen) or anaerobic (without oxygen) conditions.

Though *S. aureus* was first identified in 1880, penicillin, the first known antibiotic effective in treating the organism, wasn't discovered until 1928. Hospital-based strains quickly developed resistance to penicillin in the 1940s and 1950s. In 1959, the first semi-synthetic penicillin, methicillin, was produced by altering the chemical composition of penicillin. Two years later, the MRSA strains were reported.

In the past three decades, the prevalence of MRSA strains has steadily increased in hospitals in the United States and abroad. The data collected in the early to mid-1980s indicated that MRSA was limited mainly to relatively large urban medical centers and that rates were 5% to 10%. Smaller, non-referral centers were relatively free of MRSA, with prevalence rates well below 5%. By the 1990s, the rates among these smaller (<200 bed) community hospitals had increased to 20% and twice that rate was found in the larger urban centers. Prevalence of MRSA isolates from intensive care units approached 50% by the end of 1998 (Chambers, 2001). [The Changing Epidemiology of \*Staphylococcus aureus\*?](#)

The CDC produced two reports that provided statistical information: [The 2004 National Nosocomial Infections \(NNIS\) Surveillance System Report](#) (Division of Healthcare Quality Promotion, 2004) which was later replaced by the National Health care Safety Network (NHSN) [2008 Report](#) (Edwards, Peterson, Andrus, Dudeck, Pollock, & Horan, 2008). CDC NHSN website is at: <http://www.cdc.gov/nhsn/>

Unfortunately, none of the current or past existing databases provide adequate information to make direct assessments of the current prevalence or incidence of MRSA in the U.S. The CDC's NNIS system no longer collects hospital-wide component data, the data reported from the ICU component represent fewer than 350 U.S. hospitals, and NNIS does not include any facilities with 100 or fewer beds (the median size of a US hospital is less than 100 beds). Similarly, the NHDS only includes data from 475 hospitals and does not include any antimicrobial susceptibility testing results. In addition, a number of studies have shown the inadequacy of administrative databases compared with prospective collection of data by IPs. Nevertheless, (Klevens, Edwards, Tenover, McDonald, Horan, & Gaynes, 2006) report that the NNIS data show that the rates of MRSA infections have doubled in the ICU component between 1992 and 2003, and the proportion of *S aureus* HAIs caused by MRSA has tripled during this period (Jarvis, Schlosser, Chinn, Tweeten, & Jackson, 2007).

The proportion of health care-associated staphylococcal infections that are due to MRSA has been increasing: 2% of *S. aureus* infections in U.S. intensive-care units were MRSA in 1974, 22% in 1995, and 64% in 2004 (Klevens et.al, 2006). The prevalence study reported that their respondents reported 8654 MRSA-colonized or -infected patients in 187,058 inpatients.



Thus, the overall MRSA prevalence in US health care facilities was 46.3 per 1000 inpatients. This is 8 to 11 times higher than any previous incidence estimates (using different methodologies). Data suggest that approximately 70% of isolates were more consistent with health care-associated MRSA than community-associated MRSA (Jarvis et al., 2007).

Medical management recommendations for MRSA from the CDC address the following:

- MRSA should be considered in the differential diagnosis of skin and soft tissue infections (SSTIs) compatible with *S. aureus* infection (abscesses, pustular lesions, boils, spider bites, cellulitis).
- Incision and drainage remains a primary therapy for purulent skin infections.
- Obtain material for culture.
- No data suggest molecular typing or toxin-testing should guide management.
  - Clinical management of MRSA does not depend on categorization of the infection as health care-associated or community-associated or on strain typing. Treatment of an infection possibly caused by MRSA should be based on the clinical syndrome, severity of the infection, and local resistance patterns.
- Empiric antibiotic therapy may be needed.
- Alternative agents may be considered – more data is needed in order to develop evidence-based recommendations.
- Use local data for treatment considerations (Contact local public health and hospital surveillance system).
- Patient education on wound management is critical:
  - frequent hand washing, especially before and after wound care;
  - dispose of soiled dressings, separately bagged, in trash;
  - keep wound securely covered;
  - launder clothes and bedding using hot water and hot dryer concurrent with treatment;
  - take all medications as prescribed
- Maintain adequate medical follow-up.
- Note that treatment of MRSA infection does not necessarily result in eradication of colonization. The patient can continue to be a carrier. There is presently no good evidence base for decolonization, and decolonization is not generally recommended. However, decolonization may be an aspect of individual medical management:
  - for persons with recurrent MRSA infections despite appropriate therapy and preventive measures.
  - for persons with MRSA in a well-defined cohort with ongoing transmission and close contact (e.g. sports teams, day care).
  - in cases of recurrent infection when other sources of transmission are not identified.

## Colonization versus Infection

Humans are natural reservoirs for *S. aureus* (both resistant and medication sensitive) and asymptomatic colonization is far more common than infection. Colonization indicates the presence of the organism without symptoms of illness. The nasal cavity is the most common site to recover *S. aureus*. General population carriage rates are 25% to 50%; higher rates are observed in injection drug users, persons with insulin-dependent diabetes, patients with dermatologic conditions, patients with long-term indwelling intravascular catheters, and health care workers. Young children tend to have higher colonization rates, probably because of their frequent contact with respiratory secretions. Colonization may be transient or persistent and can last for years (Chambers, 2001) MRSA colonization is not an indication for hospital admission, prolonged hospital stays or refusal of admission to a long-term care facility. MRSA is not a “super bug.”

Infections caused by *S. aureus* (both resistant and sensitive) include but are not limited to cellulitis, pustules, furuncles, carbuncles, impetigo, bacteremia, endocarditis, wound infections and less commonly pneumonia. It also produces toxins which can cause gastroenteritis (following ingestion of contaminated foods) and in rare instances, toxic-shock syndrome.

## Decolonization

Decolonization involves the treatment of a colonized person to attempt eradication of the specific MDRO-carrier state. It is not effective, especially long term, to warrant routine use. Some health care providers attempt short-term eradication of MRSA prior to selected elective surgeries. There are circumstances in which decolonization may be considered:

- MRSA control and prevention measure during an ongoing MRSA outbreak in a well-defined cohort group having close contact
- Patient management intervention when health care provider determines that patient may benefit clinically

Decolonizing MRSA-carrier persons has been successful, short-term. Long-term MRSA decolonization is questionable. A significant number of decolonized MRSA people have had MRSA colonization reoccur. Recent studies from Sweden and Switzerland indicate the throat may serve as a reservoir. If decolonization of MRSA carrier state is of interest, various regimens have been used, although optimal regimens have not been. Along with [APIC, Guide to the Elimination of Methicillin-Resistant \*Staphylococcus aureus\* \(MRSA\) Transmission in Hospital Settings, 2<sup>nd</sup> Edition](#) (APIC Guide - MRSA in Hospital Settings, 2007)

## Risk Factors

The factors that have been identified as increasing the risk that a patient will have a MRSA infection or colonization are:

- Increased length of hospital stay
- Multiple hospitalizations, especially burn unit or ICU
- Over 65 years old
- Multiple invasive procedures
- Invasive devices such as urinary catheters or gastrostomy tubes
- Wounds
- Severe underlying disease
- Administration of broad spectrum antibiotics
- Proximity to a MRSA patient

## Community Associated – Methicillin-resistant *Staphylococcus aureus* (CA-MRSA)

Staphylococcus and MRSA can also cause illness in persons outside of hospitals and health care facilities. MRSA infections that are acquired by persons who *have not* been recently (within the past year) hospitalized or had a medical procedure (such as dialysis, surgery, catheters) are known as CA-MRSA infections. Staphylococcus or MRSA infections in the community are usually manifested as skin infections, such as cellulitis, pimples and boils, and occur in otherwise healthy people.

Unlike hospital strains, which typically are resistant to multiple antibiotics and can be shown by typing schemes to be related to other hospital strains, these so-called community strains have tended to be susceptible to other antibiotic classes and often are resistant only to beta-lactam antibiotics. Typing by pulsed-field gel electrophoresis (PFGE) also suggests that these strains are distinctive. Based on experience with other resistant *S. aureus* strains, prevalence of MRSA among community isolates may be as high as 25% within the next 5-10 years (Chambers, 2001). [The Changing Epidemiology of \*Staphylococcus aureus\*?](#)

Most recent figures from CDC report:

- Approximately 32% (89.4 million persons) and 0.8% (2.3 million persons) of the U.S. population is colonized with *S. aureus* and MRSA respectively.
- 94,000 invasive MRSA infections in the U.S. occur each year, with approximately 19,000 associated deaths. Of these, 86% are health care-associated and 14% are community-associated.
- In 2004, approximately 76% of purulent skin and soft tissue infections (SSTIs) in adults seen in 11 emergency departments were caused by *S-aureus*. Of these infections, 78% were caused by MRSA and overall MRSA caused 59% of all SSTIs.

### Risk Factors

The factors that have been identified as increasing the risk that a patient will have a CA-MRSA infection or colonization are:

- Crowding of people
- Frequent skin to skin contact
- Compromised skin
- Contaminated surfaces and shared items
- Poor personal hygiene

## **Vancomycin Intermediate/Resistant *Staphylococcus aureus* (VISA/VRSA)**

Reports in the 1990s indicated that the susceptibility of *S. aureus* to vancomycin was changing. In May 1996, the first documented infection with VISA was reported in a patient in Japan. Subsequently, infections with VISA strains have been reported in patients from the United States, Europe, and Asia. Although health care-associated spread of VISA strains has not been observed in U.S. hospitals, one report from France suggests that spread has occurred in a hospital, and spread of heteroresistant *S. aureus* strains has occurred in Japan and Hong Kong. In 2002, the first two VRSA infections were reported in patients from the United States. Both VRSA isolates contained the vancomycin resistance gene, *vanA*, commonly found in vancomycin-resistant enterococci. Vancomycin is ineffective for treatment of VRSA infections. [Investigation and Control of Vancomycin-Intermediate and –Resistant \*Staphylococcus aureus\* \(VISA/VRSA\): A Guide for Health Departments and Infection Control Personnel](#) (Hageman, Patel, Carey, Tenover, & McDonald, 2006).

To date, all VISA and VRSA isolates have been susceptible to other Food and Drug Administration approved drugs (Division of Healthcare Quality Promotion, 2007). Link: [http://www.cdc.gov/HAI/organisms/visa\\_vrsa/visa\\_vrsa.html#a1](http://www.cdc.gov/HAI/organisms/visa_vrsa/visa_vrsa.html#a1) CDC has posted, the cases of infection caused by VISA are no longer systematically tracked due to a change in tracking which occurred after the CLSI vancomycin breakpoint change occurred in 2006 (e.g., lowering intermediate from 8-16ug/ml to 4-8ug/ml). There have been nine cases of infection caused by VRSA reported in the United States.

### **Risk Factors**

Persons that developed VISA or VRSA infections had one or more of the following underlying health conditions:

- Diabetes, kidney disease
- Previous infections with MRSA
- Intravenous catheters
- Recent hospitalization
- Recent treatment with vancomycin or other antibiotic

Prolonged use of vancomycin to treat MRSA infection

## Vancomycin-Resistant Enterococci (VRE)

Enterococci are bacteria that are normally present in the human intestines and in the female genital tract and are often found in the environment. These bacteria can sometimes cause infections. Vancomycin is an antibiotic that is often used to treat infections caused by enterococci. In some cases, enterococci have become resistant to vancomycin and are called VRE. Most VRE infections occur in people in hospitals. The first reports of strains highly resistant to penicillin began to appear in the 1980s. It is thought that the widespread use and inappropriate use of antimicrobial drugs has been a factor in the increased prevalence of these resistant organisms.

From 1990 to 1997, the prevalence of VRE in enterococcal isolates from hospitalized patients increased from <1% to approximately 15%. VRE accounted for almost 25% of enterococcus isolates in NNIS ICUs in 1999, and 28.5% in 2003. "[Management of Multidrug-Resistant Organisms in Healthcare Settings 2006](#)" (CDC MDRO Guide - Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L., 2006).

[CDC's website for VRE](#) contains information collected during 2006 and 2007 showed that enterococci caused about 1 of every 8 infections in hospitals and only about 30% of these are VRE. VRE can be more common in certain groups of people such as those with weakened immune systems (CDC, 2010).

### Colonization versus Infection

Enterococci normally inhabit the bowel. Although the oral cavity and vaginal tract can become colonized, enterococci are recovered from these sites in fewer than 20% of cases. Patients are usually colonized in the gastrointestinal tract and occasionally in the urinary tract. Colonization indicates the presence of the organism without symptoms of disease.

An infection is defined as tissue invasion with subsequent clinical symptoms. Of the 14 or more enterococcal species, only *E. faecalis* and *E. faecium* commonly colonize and infect humans in detectable numbers. *E. faecalis* is isolated from approximately 80% of human infections, and *E. faecium* from the majority of the remaining infections.

Enterococcus organisms are responsible for many types of infections including urinary tract infections, intra-abdominal infections, bacteremias, surgical wound infections, pressure sores and intravenous catheter sites.

It is often difficult to distinguish gastrointestinal tract VRE colonization and infections. VRE colony counts are similar in the stool of colonized or infected patients.

## **Decolonization**

No recommendations can be made for decolonizing patients with VRE. Regimens and efficacy of decolonization protocols for VRE have not been established "[Management of Multidrug-Resistant Organisms in Healthcare Settings 2006](#)" (CDC MDRO Guide - Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L., 2006). Pages 25-28 and 47-48.

## **Risk Factors**

People who are at increased risk for VRE infection or colonization are patients who have:

- A critical illness
- Severe underlying disease or immune suppression
- Had an intra-abdominal or cardiothoracic surgical procedure
- An indwelling urinary or central venous catheter
- Had a prolonged hospital stay
- Had broad spectrum antibiotic therapy
- Received administration of oral and, to a lesser extent, intravenous (IV), vancomycin
- Proximity to a VRE patient

## ***Clostridium difficile* (C. diff)**

The following information is taken from the [APIC Guide to the Elimination of \*Clostridium difficile\* in Healthcare Settings, 2008](#).

*Clostridium difficile* is an anaerobic, gram-positive, spore-forming bacillus. Acquisition of *C. difficile* occurs by oral ingestion of spores that resist the acidity of the stomach. It is able to multiply and produces two primary toxins: toxin A and toxin B, two large exotoxins that cause inflammation and mucosal damage. It is a common cause of antibiotic-associated diarrhea. The incubation period is not clearly defined; although it may be as short as 7 days. *Clostridium difficile* Infection (CDI) has been associated with an attributable mortality rate of 6.9% at 30 days and 16.7% at one year (APIC, 2008).

### **C. difficile-associated**

- Pseudomembranous colitis
- Toxic megacolon
- Perforations of the colon
- Sepsis

### **Clinical Symptoms**

- watery diarrhea
- fever
- loss of appetite
- nausea
- abdominal pain/tenderness

### **Major Risk Factors**

- Exposure to antimicrobials (even just a single dose)
- Hospitalization
- Advanced age

### **Other Risk Factors**

- Gastrointestinal surgery/manipulation
- Long length of stay in health care settings
- Serious underlying illness
- Immunocompromised conditions
- Use of gastric acid suppressors, e.g., proton pump inhibitors

### **Colonization**

- patient exhibits *no* clinical symptoms
- patient tests positive for *C. difficile* organism and/or its toxin
- more common than *C. difficile*-associated disease

### **CDI**

- patient exhibits clinical symptoms
- patient tests positive for the *C. difficile* organism and/or its toxin



# ***Clostridium difficile* (C. diff)**

## **Laboratory Testing**

- Stool culture for *C. difficile*: This is the most sensitive test available, but the one most often associated with false-positive results due to presence of non-toxigenic strains. Stool cultures for *C. difficile* also are labor intensive and require the appropriate culture environment to grow anaerobic microorganisms. Results are available within 48-96 hours of the test. *C. difficile* isolates detected in culture should be tested for toxin production.
- Antigen detection for *C. difficile*: These are rapid tests (<1 hr) that detect the presence of *C. difficile* antigen by latex agglutination or enzyme immunoassays. They must be combined with toxin testing to verify diagnosis.
- Toxin testing for *C. difficile*:
  - Enzyme immunoassay detects both toxin A and toxin B. It is a same-day assay but less sensitive than the tissue culture cytotoxicity assay.
  - Tissue culture cytotoxicity assay detects toxin B only. This assay requires technical expertise to perform, is costly, and requires 24-48 hours for a final result. It does provide specific and sensitive results for *C. difficile*-associated disease.
- *C. difficile* toxin is unstable. The toxin degrades at room temperature and may be undetectable within 2 hours after collection of a stool specimen. False-negative results occur when specimens are not promptly tested or kept refrigerated until testing can be done.
- Molecular assay for *C. difficile*: FDA-approved PCR assays are more available to detect *C. difficile* toxin B gene directly in stool. Although highly sensitive (a negative result is fairly reliable) decreased specificity of the assays are problematic for confirmation testing. High cost is also an issue.

## **Transmission**

*Clostridium difficile* is shed in feces. Any surface, device, or material (e.g., commodes, bathing tubs, and electronic rectal thermometers) that becomes contaminated with feces may serve as a reservoir for the *C. difficile* spores. *C. difficile* spores are transferred to patients mainly via the hands of health care personnel who have touched a contaminated surface or item.

In 23% of patients, *C. difficile*-associated disease will resolve within 2-3 days of discontinuing the antibiotic to which the patient was previously exposed. The infection can usually be treated with an appropriate course (about 10 days) of antibiotics including metronidazole or vancomycin (administered orally). After treatment, repeat *C. difficile* testing is not recommended if the patients' symptoms have resolved, as patients may remain colonized.

## **Focusing on the Prevention of Disease Spread: Contact Precautions**

Use Contact Precautions: for patients with known or suspected CDI.

### **1. Patient Placement**

Place these patients in private rooms with a bathroom that is solely used by that patient. If private rooms are not available, the infection control team should assess the risks and determine if rooms can be closed off or if utilization of the three foot spatial separation between beds can be enforced. These patients may be placed in rooms (cohorted) with other patients with *C. difficile*-associated disease.

## 2. Personal Protective Equipment (PPE)

Gloves and gowns should be provided. Until conclusive data is generated concerning the use of gloves alone, gowns should continue to be worn with gloves for all interactions that may involve contact with the patient, contaminated equipment, or potentially contaminated areas within the patient's environment. Gloves and gowns should be donned before entering the room and discarded before exiting the patient's room/cubicle.

Visit the CDC website [www.cdc.gov/ncidod/dhqp/ppe.html](http://www.cdc.gov/ncidod/dhqp/ppe.html) for a video and posters illustrating proper PPE donning and removal procedures.

### 3. Patient Transport

Movement of the patient outside the room should be limited to medically necessary purposes.

- Patients should be taught to perform hand hygiene prior to leaving room
- The transporter should removed and discard contaminated PPE and perform hand hygiene prior to transporting patients
- Clean PPE should be donned to handle the patient at the transport destination
- The patient's isolation status should be communicated to the receiving unit **prior to transport**.

### 4. Patient Care Equipment, Instruments, Devices and the Environment

*C. difficile* contaminates patient care equipment and devices through fecal shedding or through the contaminated hands of patient or healthcare provider. *C. difficile* spores can exist for five months on hard surfaces. In one study, spores were found in 49% of the rooms occupied by patients with CDI and 29% of the time in rooms of asymptomatic carriers. The heaviest contamination is on floors and in bathrooms (APIC, 2008, p. 32).

According to the [Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008](#) (APIC, 2008) *C. difficile* spore-production can increase when exposed to non-chlorine based cleaning agents and the spores are more resistant than vegetative cells to commonly used surface disinfectants, some investigators have recommended use of dilute solutions of hypochlorite (1,600 p.p.m. available chlorine) for routine environmental disinfection of rooms of patients with *C. difficile*-associated diarrhea or colitis, to reduce the incidence of *C. difficile* diarrhea, or in units with high *C. difficile* rates (Placeholder1). Note: EPA-registered hospital disinfectants are recommended for general use whenever possible in patient-care areas. At present there are no EPA-registered products with specific claims for inactivating *C. difficile* spores, but there are a number of registered products that contain hypochlorite. If an EPA-registered proprietary hypochlorite product is used, consult the label instructions for proper and safe use conditions.

Contact time is an important factor in proper environmental control. Contact time refers to the amount of time necessary for the germicide to come into contact with the organism and result in a significant reduction in the number of micro-organisms. When applying the concept of contact time in the healthcare environment, it is vital for the IP to know the contact time of the selected germicide and how to apply this knowledge. Germicides commonly used in the healthcare setting have a contact time of 10 minutes, although some have a shorter contact time. This means that the surface being disinfected should come into contact with the germicide (stay wet after cleaning) for 10 minutes (or less according to the specifics of the germicide) in order to reduce the amount of organisms by 3 logs (99%). This can best be accomplished by using the bucket method of cleaning, where the germicide is mixed with the appropriate amount of water in accordance with manufacturer's recommendations and placed in a clean

bucket or container. A clean cloth is used during cleaning, and the cleaning process prohibits the dirty cloth from returning to the bucket or container of clean germicide. The germicide solution must be changed periodically to ensure its effectiveness, and buckets or containers are washed and disinfected regularly, in addition to being inspected for cracks. The practices used during cleaning and disinfection should be clearly outlined in policy format and observation used to evaluate adherence.

#### 5. Discontinuing Contact Precautions

It is currently recommended that Contact Precautions may be discontinued when the patient no longer has diarrhea. Because of continued environmental contamination and patient skin colonization, some experts recommend continuing contact precautions for two days after diarrhea stops.

#### 6. Assessing Adherence to Isolation Precautions

Assessing adherence with isolation precautions is an important element in prevention. The following link is an example of a standard adherence checklist: [Figure 8.1 - Infection Prevention and Control Isolation Compliance Checklist](#)

\*See Hand Hygiene for prevention of CDI.

## **MDRO Specific Updates**

This page intentionally left blank for future updates.

# Hand Hygiene

Hand hygiene, utilizing soap and water, is the single most important factor in preventing and controlling the spread of MDROs. Transient flora, which colonize the superficial layers of the skin, are more amenable to removal by routine hand hygiene. Normal flora and pathogens are often acquired by HCWs during direct contact with patients or contact with contaminated environmental surfaces within close proximity of the patient. Transient floras are the organisms most frequently associated with health care-associated infections.

In vitro studies report alcohol-based products to be highly effective against a broad spectrum of bacteria, including MDROs, fungi and some viruses. Studies have also indicated that these products increase health care worker compliance with hand hygiene practices. Alcohol-based hand rubs have been reported to be more accessible than soap and water and take less time to use, but should only be used when hands are not visibly soiled.

Antimicrobial-impregnated wipes (e.g., towelettes) may be considered as an alternative to washing hands with non-antimicrobial soap and water. Because they are not as effective as alcohol-based hand rubs or washing hands with antimicrobial soap and water for reducing bacterial counts on the hands of HCWs, they are not a routine substitute for using an alcohol-based hand rub or antimicrobial soap.

Hand hygiene for *Clostridium difficile* infections can be controversial as current information on the need to use traditional hand washing, as compared to using alcohol hand rubs, is conflicting. Common antimicrobial agents (including alcohols, chlorhexidine, hexachlorophene, iodophors, PCMX, and triclosan) for hand washing are not active against spores. The benefit of hand washing with soap and water is the friction or physical removal and dilution of spores from the hands, rather than the killing of spores.

After gloves are removed, healthcare providers' hands should be washed with a non-antimicrobial or an antimicrobial soap and water, or disinfected with an alcohol-based hand rub. Hospitals using alcohol-based hand rubs as their primary means of hand hygiene have not seen increases in the incidence of *C. diff* associated with their introduction. The increased incidence of *C. diff* infections noted in numerous hospitals has been attributed to the introduction of the epidemic *C. difficile* strain NAP1 and not due to increased use of alcohol based hand rubs. However, during outbreaks or evidence of on-going transmission of *C. diff*-related infections in an institution, washing hands with a non-antimicrobial or antimicrobial soap and water after removing gloves and other personal protective equipment (PPE) is prudent. (APIC, 2008). Link: [http://www.apic.org/Content/NavigationMenu/PracticeGuidance/APICEliminationGuides/C.diff\\_Elimination\\_guide\\_logo.pdf](http://www.apic.org/Content/NavigationMenu/PracticeGuidance/APICEliminationGuides/C.diff_Elimination_guide_logo.pdf)

**The practice of double-gloving to avoid hand hygiene activities is not an acceptable practice.** A health care worker (HCW) should not wear two sets of gloves to perform two different tasks, one dirty and one clean. For example, the HCW should not perform toiletry care, remove the outside set of gloves and then proceed to

administer oral medication. **This example is an unacceptable practice.** A new pair of gloves and hand hygiene is required between dirty and clean tasks/procedures. Hand hygiene should be performed after glove removal.

Providing recommended hand hygiene education to patients/residents is another important preventative strategy. Patients/residents and visitors should receive education (verbal, written, graphical) on when to perform hand hygiene and the correct method. Hand hygiene for patients/residents should, at a minimum, be completed after using the toilet, before eating, and before leaving the assigned room. If the patient/resident cannot complete this task independently and/or consistently, staff needs to be educated on assisting these patients/residents to accomplish this task.

Please refer to the [CDC Guideline for Hand Hygiene in Health-Care: Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force, 2002](#). (CDC Guide - Hand Hygiene, Boyce, J.; Pittet, D., 2002).

These recommendations support the use of alcohol-based hand rubs and gives staff members the option of cleaning their hands with soap and water or alcohol-based hand rubs after the removal of gloves and when hands are not visibly soiled. Using the alcohol-based hand rub, according to the 2002 CDC guidelines, is considered best practice.

The majority of alcohol-based hand antiseptics contain isopropanol, ethanol, or a combination of these two products. The antimicrobial activity of alcohols can be attributed to their ability to denature proteins. Alcohol solutions containing 60-95% alcohol are most effective. Numerous studies have been documented regarding the antimicrobial activity and the effectiveness of alcohols in reducing bacterial counts on hands. These guidelines cite studies that state that alcohol-based products are more effective for standard hand washing or hand antisepsis by health care workers than soap or antimicrobial soaps. In studies examining antimicrobial-resistant organisms, alcohol-based products reduced the number of multi-drug resistant pathogens recovered from the hands of health care workers more effectively than did hand washing with soap and water. Alcohols are also effective for preoperative cleaning of the hands of surgical personnel and were found to have residual effect for up to 3 hours in the operating rooms. Many alcohol-based products have added emollients (oils) to the chemical make-up of the product to help prevent hand dryness. Apply hand lotion/cream to replenish the oils in the skin (CDC Guide - Hand Hygiene, Boyce, J.; Pittet, D., 2002).

### **When to perform hand hygiene for HCWs: page 26 of Hand Hygiene Guidelines**

- before direct contact with patients
- before eating
- before donning sterile gloves for insertion of a central intravascular catheter
- before inserting indwelling urinary catheters, peripheral vascular catheters, or other invasive devices that do not require a surgical procedure
- after contact with patient's intact skin, e.g., when taking a pulse, blood pressure or lifting a patient
- after contact with body fluids or excretions, mucous membranes, non-intact skin, and wound dressings, even if not visibly soiled
- after contact with inanimate objects, including medical equipment, in immediate vicinity of the patient
- after removing gloves
- after using the restroom
- after touching a contaminated body site, and before moving to a clean body site during patient care

Refer to your state or Local Public Health regulations for hand hygiene requirements in food service. <http://nebraskaccess.ne.gov/foodrules.asp>

### **Soap and Water:**

When hands are **visibly soiled**: showing visible dirt or visibly contaminated with proteinaceous material, blood, or other body fluids (e.g., fecal material or urine) (Guideline for Hand Hygiene in Health-Care Settings, 2002, p.4). Wash hands with soap (either non-antimicrobial or antimicrobial) and water.

### **Hand Washing Procedure** (see Appendices 3 & 4 for hand washing teaching sheet):

- use soap and warm running water
- wet hands with water **before** applying soap
- rub soap (use friction) between fingers and over hands for at least 15-20 seconds
- rinse hands well under a stream of water
- dry hands thoroughly using disposable paper towels
- turn off faucet with a clean/dry paper towel
- consider using a paper towel to turn door knob when leaving the patient/resident's contact precautions room
- apply hand lotion/cream to replenish the oils in the skin (verify compatibility with antibacterial chemical in soap and latex in gloves)

Liquid, bar, leaflet or powdered forms of soap are acceptable for plain soap applications. When bar soap is used, the soap holder/container must facilitate water drainage away from bar to allow air drying of soap. The sharing of bar soap is not recommended. (CDC Guide - Hand Hygiene, Boyce, J.; Pittet, D., 2002)



## Alcohol-based hand rubs:

These products are used when hands are *not* visibly soiled.

### Alcohol Based Hand Rub Procedure (follow manufacture's recommendations)

- dispense alcohol based hand rub into palm of hand or fingers (amount as directed by manufacturer; enough to wet the hands completely);
- spread alcohol based hand rub over both hands and include wrists;
- rub alcohol based hand rub vigorously over hand and wrist surfaces until DRY;
- Alcohol-based hand rubs are *not* active against *C. difficile* spores.
- Use in addition to hand washing with c-diff (keeps a consistent message of appropriate hand hygiene)

Note: Alcohol based products must contain at least 60% alcohol to be effective. In the United States, such preparations usually contain 60%–95% ethanol or isopropanol (CDC Guide - Hand Hygiene, Boyce, J.; Pittet, D., 2002, p. 3).

## Artificial Fingernails or Extenders

Do not wear artificial fingernails or extenders when having direct contact with patients at high risk (e.g., those in intensive-care units or operating rooms).

## Jewelry

Jewelry in the health- care setting is an unresolved issue. Several studies have demonstrated that skin underneath rings is more heavily colonized than comparable areas of skin on fingers without rings (CDC Guide - Hand Hygiene, Boyce, J.; Pittet, D., 2002). Some institutions have incorporated policies that require jewelry to be washed with hands (**do not remove jewelry**) when completing hand hygiene.

Surgical standards require that no rings, watches, and/or bracelets can be worn during surgery and must be removed before beginning the surgical hand scrub. Institutions should be monitoring staff for compliance.

## Hand Hygiene Updates

This page intentionally left blank for future updates.

## Standard Precautions to Prevent Transmission of MDROs

There are two tiers of HICPAC/CDC precautions to prevent transmission of infectious agents, Standard Precautions and Transmission-Based Precautions. See Appendix 5 for the Standard versus Transmission-Based Contact Precautions Table. The information for this section comes from the [CDC Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, 2007](#) (CDC Isolation Guide, Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L., 2007).

### Standard Precautions

Implementation of *Standard Precautions* constitutes the primary strategy for the prevention of health care-associated transmission of infectious agents among patients and health care personnel. See Appendix 4 – Application of Standard Precautions.

Standard Precautions combines the major components of Universal Precautions and Body Substance Isolation. They are based on the principle that all blood, body fluids, secretions, excretions except sweat, non-intact skin, and mucous membranes may contain transmissible infectious agents.

Standard Precautions include a group of infection prevention practices that apply to all patients, regardless of suspected or confirmed infectious status, in any setting in which health care is delivered. These include

- hand hygiene
- use of gloves, gown, mask, eye protection, or face shield, depending on the anticipated exposure
- Safe injection practices.

Also, equipment or items in the patient environment likely to have been contaminated with infectious fluids must be handled in a manner to prevent transmission of infectious agents (e.g., wear gloves for direct contact, contain heavily soiled equipment, properly clean and disinfect or sterilize reusable equipment before use on another patient).

The application of Standard Precautions during patient care is determined by the nature of the healthcare worker – patient interaction and the extent of anticipated blood, body fluid, or pathogen exposure. For some interactions (e.g., performing venipuncture), only gloves may be needed; during other interactions (e.g., intubation), use of gloves, gown, and face shield or mask and goggles is necessary (CDC Isolation Guide, Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L., 2007)

# Transmission-based: Contact Precautions to Prevent Transmission of MDROs

## Transmission-based Precautions

The information for this section comes from the [CDC Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, 2007](#) (CDC Isolation Guide, Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L., 2007)

Transmission-based Precautions are for patients who are known or suspected to be infected or colonized with infectious agents, including certain epidemiologically important pathogens, which require additional control measures to effectively prevent transmission. Transmission-based Precautions are used empirically, according to the clinical syndrome and the likely etiologic agents at the time, and then modified when the pathogen is identified or a transmissible infectious etiology is ruled out.

### Contact Precautions

Standard Precautions plus Transmission-based Precautions are recommended for the control of either infected or colonized MDRO patients. There are three categories of Transmission-Based Precautions: Contact Precautions, Droplet Precautions, and Airborne Precautions. Transmission-based Precautions are used when the route(s) of transmission is (are) not completely interrupted using Standard Precautions alone. For this document we will focus on Contact Precautions. Long Term Care, Rehabilitation, and other settings may make modifications to the guidelines based on their needs and environment

Since the nature of interaction with the patient cannot be predicted with certainty and contaminated environmental surfaces are important sources for transmission of pathogens, health care personnel caring for patients on Contact Precautions are advised to wear a gown and gloves for all interactions. When Contact Precautions are used (i.e., to prevent transmission of an infectious agent that is not interrupted by Standard Precautions alone and that is associated with environmental contamination), donning of both gown and gloves upon room entry is indicated to address unintentional contact with contaminated environmental surfaces. Donning personal protective equipment (PPE) upon room entry and discarding before exiting the patient room is done to contain pathogens, especially those that have been implicated in transmission through environmental contamination.

**Gloves (clean, non-sterile)** are worn when *entering* the Contact Precautions room. Gloves should be changed in the course of providing care for the patient if there is contact with infective material that may contain high concentrations of MDROs. With clean gloves, position any needed personal items within patient's reach (e.g., call light, bedside stand, telephone, remote, etc.), open the door, adjust the lighting, etc. Perform hand hygiene immediately after glove removal. Using a dry paper towel to open the door or turn off room lights may be beneficial in protecting hands from contamination.

**Gowns (clean, non-sterile)** are worn when *entering room*. A gown offers protection when the patient is incontinent, has diarrhea, an ileostomy, a colostomy, or wound drainage not contained by a dressing. Remove the gown before leaving the patient's environment. After gown removal, ensure that clothing does not contact potentially contaminated environmental surfaces to avoid transfer of microorganisms to other patients or environments. Perform hand hygiene after gown and glove removal.

**Masks and eye protection** are indicated if patient care activities are likely to generate coughing, splashes or sprays of blood, body fluids, and secretions are likely to be encountered to the eyes, nose and mouth.

### **Cohorting Patients**

The practice of cohorting (grouping patients with same infectious disease) MDRO patients to an assigned area of the facility (e.g., one clinical unit) with dedicated staff has been discussed in the literature as a strategy to control outbreak situations. This is not a prevention strategy due to logistical difficulties encountered, lack of availability to current MDROs' laboratory resistant patterns (e.g., cultures with antibiotic sensitivity results) and lack of data confirming infection versus colonization status. These barriers are especially problematic for settings that do not have access to laboratory findings and access to patient private room accommodations.

The practice of cohorting MDRO patients as roommates remains an unresolved issue. The risk of transmitting a more virulent and/or different strain of the pathogen to the roommate is a concern. Infected patients are known to have a higher bioburden (number of MDROs) than colonized patients. Compliance with Standard Precautions and Hand Hygiene is critical when providing care between roommates. Cohorting is a risk management issue that each facility should address exploring the risks and the benefits. Seeking assistance from an infectious disease expert may be helpful.

Some facilities explore the feasibility of cohorting by examining

- clinical diagnosis
- microbiological results between roommates (e.g., culture results with similar antibiotic sensitivity patterns; current results more meaningful)
- epidemiology of involved MDRO, including mode of transmission
- presence of infection or colonization with other potentially transmissible microorganisms (e.g., MRSA patients should never cohort with a VRE patient)
- minimal likelihood of re-infection with the same organism
- health status (immunocompromised)
- invasive devices
- existing non-intact skin conditions
- contained wound drainage
- control over body excretions
- the patient's ability and willingness to comply with preventative strategies.

## Discontinuing Contact Precautions

The CDC Guideline for Isolation Precautions: Prevention of Transmission of Infectious Agents in Health care Settings 2007 states that the duration of contact precautions for patients who are colonized or infected with MDROs remains undefined. MRSA is the only MDRO for which effective short term decolonization regimens are available. However, carriers of MRSA who have negative nasal cultures after a course of systemic or topical therapy may resume shedding MRSA in the weeks that follow therapy.

Although early guidelines for VRE suggested discontinuation of Contact Precautions after three stool cultures obtained at weekly intervals proved negative, subsequent experiences have indicated that such screening may fail to detect colonization that can persist for greater than one year. Likewise, available data indicate that colonization with VRE, MRSA, and possibly MDR-GNB, can persist for many months, especially in the presence of severe underlying disease, invasive devices, and recurrent courses of antimicrobial agent.

Although there is no published industry standard, some infectious disease specialists may discontinue contact precautions for MRSA or VRE after three negative cultures (from the nares for MRSA and the peri-rectal area for VRE), taken about one week apart, from a patient who has been off of antibiotics for at least a week. However, these specialists encourage people not to get too fixated on this schedule, as a percentage of these cases test positive for MRSA or VRE at a later time. Anyone using the above criteria should be aware that some patients will be positive even though screening culture results were negative.

It may be prudent to assume that MDRO carriers are colonized permanently and manage them accordingly. Alternatively, an interval free of hospitalizations, antimicrobial therapy, and invasive devices (e.g., 6 or 12 months) before re-culturing patients to document clearance of carriage may be used. Determination of the best strategy awaits the results of additional studies. See the [Management of Multidrug-Resistant Organisms in Healthcare Settings 2006](#) (CDC MDRO Guide - Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L., 2006) for discussion of possible criteria to discontinue Contact Precautions for patients colonized or infected with MDROs.

## Precautions Updates

This page intentionally left blank for future updates.

# Laboratory Detection

## MRSA / VISA / VRSA

Research shows that staphylococcal resistance to oxacillin/methicillin occurs when an isolate carries an altered penicillin-binding protein, PBP2a, which is encoded by the *mecA* gene. The alteration of the penicillin-binding protein does not allow the drug to bind well to the bacterial cell, resulting in resistance to  $\beta$ -lactam antimicrobial agents.

When resistance was first described in 1968, methicillin was commonly used to test and treat infections caused by *S. aureus*. Now methicillin is no longer the agent of choice; oxacillin and nafcillin are widely used. However, the acronym MRSA is still used by many to describe these isolates because of its historic role. Strains of *S. aureus* that are oxacillin and methicillin resistant (MRSA) are also resistant to all  $\beta$ -lactam agents, including cephalosporins and carbapenems. MRSA isolates are often multiply resistant to other commonly used antimicrobial agents, including erythromycin, clindamycin and tetracycline.

## VRE

Enterococci are intrinsically less susceptible to many antibiotics. Penicillin, ampicillin, piperacillin, imipenem and vancomycin are among the few antibiotics that show consistently inhibit activity against *E. faecalis*.

There are two types of vancomycin resistance in enterococci.

1. The first type is intrinsic resistance. Isolates of *E. gallinarum* and *E. casseliflavus*/*E. flavescens* demonstrate a genetic-based, nontransferable low-level resistance to vancomycin.
2. The second type of resistance is acquired resistance. They can become resistant to vancomycin by acquisition of genetic information from another organism. Most commonly this resistance is seen in *E. faecium* and *E. faecalis*, but also has been recognized in *E. raffinosus*, *E. avium*, *E. durans*. Several genes, including *vanA*, *vanB*, *vanC*, *vanD* and *vanE*, contribute to resistance to vancomycin in Enterococci.

*E. faecium* is the most frequently isolated species of VRE in hospitals and typically produces high vancomycin (>128ug/ml minimum inhibitory concentrations [MICs]). These isolates typically contain *vanA* genes. *VanB* containing isolates typically produce lower level resistance to vancomycin.

Identification of VRE to species level aids in confirming whether an isolate has intrinsic (*vanC*) or acquired resistance (*vanA* or *vanB*). Knowledge of the type of resistance is critical for infection control purposes. *VanA* and *vanB* genes are transferable and can spread from organism to organism. In contrast, *vanC* and *vanD* genes are not transferable, and have been associated less commonly with serious infections, and have not been associated with outbreaks. Presumptive identification of the genus *Enterococcus* can be made on primary isolation plates and by using colonial morphology, a Gram stain, and a pyrrolidonyl arylamidase (PYR) test.



# Laboratory Workup

## MRSA

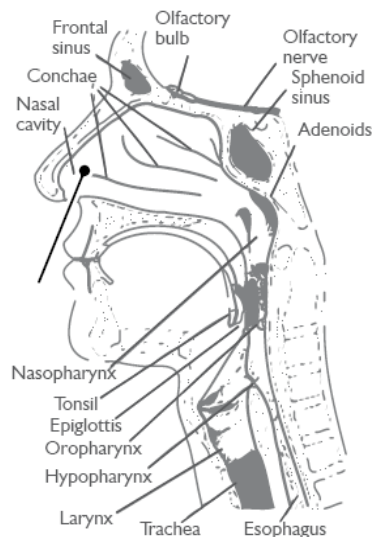
When culturing invasive sites (tracheostomies, pressure ulcers, gastric tube [g-tube] sites, wounds, dermatitis, etc.), the site should first be gently cleansed with a sterile gauze sponge moistened with saline. Using a sterile moistened swab, gently swab the site with a rolling motion. Be sure to swab the area beyond any pus or destroyed tissue. Culturing the pus or destroyed tissue may result in a false negative result because these dead cells may not contain live bacteria. Transport the specimen in a transport media according to the manufacturer's directions. Gloves should be worn when collecting cultures.

The nasal specimen collection procedure:

1. Use a sterile standard culturette to obtain the specimen
2. Culture both anterior nares utilizing one culture swab
3. Rotate moistened swab in each nares two to five times clockwise and counterclockwise. The process should gently rub across the nasal mucous membranes about three-fourths of an inch into the nasal passage (adult) so that squamous epithelial cells from the inside of the nose are obtained.

Follow manufacturer's instructions specific to the MRSA test methodology for nasal specimen collection if available. (APIC Guide - MRSA in Hospital Settings, 2007, p. 36)

Figure 4. Nasal Specimen Collection (adapted from *The Merck Manual online—Second Home Edition*)



Cultures being processed for a clinical infection work-up (versus screenings) should have full sensitivity testing performed according to the laboratory's protocols. When used correctly, broth-based and agar-based tests usually can detect MRSA. Oxacillin screen plates (agar plate containing 6 mcg/ml of oxacillin and Mueller-Hinton agar supplemented with NaCl (4% w/v; 0.68 mol/L) can be used as a back-up method.

Accurate detection of oxacillin/methicillin resistance can be difficult due to the presence of two subpopulations (one susceptible and the other resistant) that may coexist within a culture. All cells in a culture may carry the genetic information for resistance, but only a small number can express the resistance in vitro. This phenomenon, termed heteroresistance, is a problem for clinical laboratory personnel because cells expressing heteroresistance grow more slowly than the oxacillin-susceptible population. This is why the Clinical and Laboratory Standards Institute (CLSI) recommends incubating isolates being tested against oxacillin, methicillin or nafcillin at 35 degrees centigrade for a full 24 hours before reading.

The National Committee for Clinical Laboratory Standards (NCCLS), now known CLSI set sensitivity breakpoints for *S. aureus*. These are different than those set for coagulase-negative *Staphylococci*. MIC stands for Minimum Inhibitory Concentrations. (CDC - Lab Detection - MRSA, 2010)

<b>Interpretive Criteria (in µg/ml) for Oxacillin MIC Tests</b>			
	<b>Susceptible</b>	<b>Intermediate</b>	<b>Resistant</b>
<b><i>S. aureus</i></b>	≤ 2 µg/ml	N/A	≥ 4 µg/ml
<b>CoNS</b>	≤ 0.25 µg/ml	N/A	≥ 0.5 µg/ml
<b>Interpretive Criteria (in mm) for Oxacillin Disk Diffusion Tests</b>			
	<b>Susceptible</b>	<b>Intermediate</b>	<b>Resistant</b>
<b><i>S. aureus</i></b>	≥ 13 mm	11-12 mm	≤ 10 mm
<b>CoNS</b>	≥ 18 mm	N/A	≤ 17mm

N/A = not applicable

<b>Interpretive Criteria (in mm) for Cefoxitin Disk Diffusion Test</b>			
	<b>Susceptible*</b>	†	<b>Resistant**</b>
<b><i>S. aureus</i></b>	≥ 22 mm		≤ 21 mm
<b>CoNS</b>	≥ 25 mm		≤ 24 mm

\* Report as oxacillin susceptible

\*\* Report as oxacillin resistant

†There is no intermediate category with the cefoxitin disk diffusion test

More sophisticated tests can be used to identify resistance. Amplification tests like those based on the polymerase chain reaction (PCR) can detect the *mecA* gene. During an outbreak situation, the laboratory should save all isolates for further phage/plasmid typing or chromosome analysis.

For screening, commercial media has been made available that contains chromogenic enzyme substrates (CHROMagar MRSA 263,264). This has been shown to have high sensitivity and specificity for the identification of MRSA as early as 16 hours after inoculation. Real-time PCR tests are also available for rapid detection of MRSA directly from the culture swabs (less than 1-2 hours).

## VISA / VRSA

Most isolates of *S. aureus* are susceptible to vancomycin. The concentration of vancomycin required to inhibit these strains (called the minimal inhibitory concentration or MIC) is typically between 0.5 and 2 micrograms/mL ( $\mu\text{g/mL}$ ). In contrast, *S. aureus* isolates for which vancomycin MICs are 4-8  $\mu\text{g/mL}$  are classified as vancomycin-intermediate, and isolates for which vancomycin MICs are  $\geq 16 \mu\text{g/mL}$  are classified as vancomycin-resistant. The revised definitions for classifying isolates of *S. aureus* are based on the interpretive criteria published in January 2006 by the Clinical and Laboratory Standards Institute. As of June 2010, only nine resistant (vancomycin MIC > 32 mcg/ml) isolates have been documented in the United States.

Not all susceptibility testing methods can detect VISA and VRSA isolates. Three out of six confirmed VRSA isolates were not reliably detected by automated testing systems in a recent report. Subsequently, some manufacturers have optimized their systems for VRSA detection, so laboratories should check with manufacturers to determine if their system has FDA clearance for VRSA detection. VRSA are detected by reference broth microdilution, agar dilution, Etest®, MicroScan® overnight and Synergies plus™; BD Phoenix™ system, Vitek2™ system, disk diffusion, and the vancomycin screen agar plate [brain heart infusion (BHI) agar containing 6  $\mu\text{g/ml}$  of vancomycin].

## VRE

When VRE is isolated from a clinical specimen, its vancomycin resistance can be confirmed by repeating antimicrobial susceptibility testing using any of the recommended methods, particularly if VRE isolates are unusual in the hospital, or streak 1  $\mu\text{L}$  of standard inoculum (0.5 McFarland) from an isolated colony of enterococci onto commercially available brain heart infusion agar plate containing 6  $\mu\text{g/mL}$  of vancomycin, incubate the inoculated plate for 24 hours at 35 C (95 F), and consider any growth indicative of vancomycin resistance. The National Committee for Clinical Laboratory Standards (NCCLS) recommends performing a vancomycin MIC test and also motility and pigment production tests to distinguish species with acquired resistance (*vanA* and *vanB*) from those with *vanC* intrinsic resistance. (NCCLS - National Committee for Clinical Laboratory Standards, 1999).

The laboratory procedure for screening for VRE can be accomplished in a number of ways in the lab.

1. For inoculating peri-rectal/anal swabs or stool specimens directly, bile esculin azide agar plates containing 6  $\mu\text{g/ml}$  of vancomycin can be used. The enterococcus organisms will appear as “black” colonies.
2. Vancomycin resistance can also be determined for enterococcal colonies available in pure culture by inoculating a suspension of the organism onto a commercially available brain heart infusion agar containing 6  $\mu\text{g/ml}$  vancomycin.

Vancomycin resistance for enterococci isolated from blood, sterile body sites (with the possible exception of urine), and other sites are determined as clinically indicated.

Laboratories routinely may test wound and urine isolates for resistance to vancomycin if resources permit . Laboratories that use disk diffusion should incubate plates for 24 hours and read zones of inhibition by using transmitted light.

1. Minimum inhibitory concentrations can be determined by agar dilution, agar gradient dilution, broth macrodilution, or manual broth microdilution. These test systems should be incubated for 24 hours.
2. The fully automated methods of testing enterococci for resistance to vancomycin currently are unreliable.

The result of the test is usually expressed as a minimum inhibitory concentration (MIC) or the minimum amount of antimicrobial agent that inhibits bacterial growth in the test tube. Therefore, staph bacteria are classified as VISA if the MIC for vancomycin is 4-8 µg/ml, and classified as VRSA if the vancomycin MIC is  $\geq 16$  µg/ml.

Resources:

[CDC Website: Laboratory Detection of Oxacillin/Methicillin-resistant \*Staphylococcus aureus\*.](#) (CDC - Lab Detection - MRSA, 2010).

CDC Website: [Vancomycin-resistant Enterococci \(VRE\) and the Clinical Laboratory.](#) (CDC - Lab Detection - VRE, 2010).

Performance Standards for Antimicrobial Susceptibility Testing, Sixteenth Informational Supplement. M100-S16. (CLSI - Clinical and Laboratory Standards Institute, 2006).

[Performance Standards for Antimicrobial Susceptibility Testing, Seventeenth Informational Supplement. M100-S17.](#) (CLSI - Clinical and Laboratory Standards Institute, 2007).

[Performance Standards for Antimicrobial Susceptibility Testing; Twentieth Informational Supplement. M100-S20.](#) (Clinical and Laboratory Standards Institute, 2010).

## **Culturing of Health care Workers, Patients and the Environment**

Routine culturing of HCWs, patients and the environment is not recommended.

Active surveillance cultures from patients may be considered when other control measures have been ineffective or to target patients who are identified as high risk for MDRO colonization (e.g., patients in intensive care, patients transferred from facilities known to have high MDRO prevalence rates, roommates of colonized or infected persons, and patients known to have been previously infected or colonized with an MDRO).

Culturing may be considered in the presence of noted outbreaks and or clusters of MDRO positive cultures among patients as defined by pulse-field gel electrophoresis (PFGE) or other biotyping methods.

Decolonization of individuals based solely on a positive culture result is not recommended. Consult with physicians with expertise in infectious disease. [“Management of Multidrug-Resistant Organisms in Healthcare Settings 2006”](#) (CDC MDRO Guide - Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L., 2006)

## Laboratory Updates

This page intentionally left blank for future updates.

# Outbreak Management

## Definition of MDRO Outbreak / Epidemic

The common definition of an outbreak is: several (e.g., 3 or more health care-associated infection cases of MDRO which are epidemiologically associated by person, time or place), or a substantial increase in the number of cases in a facility. Each facility must decide the criteria to define an outbreak in their institution.

Upon the recognition of an outbreak of an MDRO in a facility, actions should be taken to quickly contain the outbreak and resolve it. If these actions are unsuccessful, calling the local or state health department for consultation/assistance with an MDRO outbreak is essential. In the State of Nebraska, outbreaks of MDROs are required to be reported.

## Management of an Outbreak

When an outbreak is recognized, immediately notify administration and employees. An outbreak may affect the non-acute care facility or a hospital's ability to accept new admissions. The facility should not be prevented from discharging patients/residents/clients, provided the guidelines for admissions/discharges are followed.

According to the "[Management of Multidrug-Resistant Organisms in Healthcare Settings 2006](#)" (CDC MDRO Guide - Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L., 2006), a two tiered approach should be followed for the control of MDROs (See Appendices 9 & 10 - Tier 1 and 2 – Control of MDROs). Reports describing successful control of MDRO transmission in health care facilities have included seven categories of interventions. These include: administrative support, judicious use of antimicrobials, surveillance (routine and enhanced), Standard and Contact Precautions, environmental measures, education and decolonization. In the studies reviewed, these interventions were applied in various combinations and degrees of intensity, with differences in outcome. As a rule, these reports indicate that facilities confronted with a MDRO problem selected a combination of control measures, implemented them, and reassessed their impact. In some cases, new measures were added serially to further enhance control efforts. This evidence indicates that the control of MDROs is a dynamic process that requires a systematic approach tailored to the problem and health care setting.

The nature of this evidence gave rise to the two-tiered approach to MDRO control recommended by the CDC. This approach provides the flexibility needed to prevent and control MDRO transmission in every kind of facility addressed by this guideline. Appendices 9 & 10 are CDC's two tier approach to the control of MDROs.

### Tier 1 – Appendix 9

Tier 1 is the baseline level of MDRO control activities. It is designed to ensure recognition of MDROs as a problem, involvement of health care administrators, and provision of safeguards for managing unidentified carriers of MDROs.

## **Tier 2 – Appendix 10**

Tier 2 deals with the emergence of an MDRO problem that cannot be controlled with the basic, Tier 1, set of infection control measures. Additional control measures should be selected from Tier 2 interventions presented in this table. Decisions to intensify MDRO control activity arise from surveillance observations and assessments of the risk to patients in various settings.

Circumstances that may trigger these decisions include:

- Identification of an MDRO from even one patient in a facility or special unit with a highly vulnerable patient population (e.g., an ICU, NICU, burn unit) that had previously not encountered that MDRO.
- Failure to decrease the prevalence or incidence of a specific MDRO (e.g., incidence of resistant clinical isolates) despite infection control efforts to stop its transmission. (Statistical process control charts or other validated methods that account for normal variation can be used to track rates of targeted MDROs).

The combination of new or continued findings of MDRO cases and patients at risk necessitates the use of Tier 2 recommendations. Before advancing to Tier 2 control activities, verify compliance of Tier 1 recommendations.

Once you have identified that Tier 1 recommendations are in compliance seek a knowledgeable infection prevention and control professional or health care epidemiologist for assistance in implementing Tier 2 recommendations. This approach requires support from the governing body and medical staff of the facility. Once interventions are implemented, ongoing surveillance should be used to determine whether selected control measures are effective and if additional measures or consultation are indicated. The result of this process should be to decrease MDRO rates to minimum levels.

Ongoing MDRO outbreaks or high endemic rates are not acceptable in the health care setting. With selection of infection control measures appropriate to the situation, all facilities can achieve the desired goal and reduce the MDRO burden substantially.

### **Employee Surveillance Cultures**

Employees should only be cultured if it is epidemiologically implicated in the transmission (e.g., a health care provider is identified as a common link among culture-positive patients). Appropriate sites for culturing MRSA are nares and other sites as indicated (e.g., open wounds). Cultures for VRE should be obtained from the rectum and other sites as indicated (e.g., open wounds). An epidemiologically implicated culture-positive caregiver should be counseled regarding infection control measures and any deficiencies in techniques should be corrected immediately. More definitive control measures, such as, decolonization, have been explored, and removal of the employee from the care of high-risk patients may be considered if the initial steps fail.



During an outbreak, when initial control measures are unsuccessful, control measures may be expanded to include cohorting. (All patients with the same involved pathogen should be physically grouped together and separated from the rest of the patient/client population). Ideally, and when possible, the same employees should be assigned to the care of this population throughout the outbreak (cohorting staff).

If health care workers must provide care for patients outside the cohort, meticulous hand hygiene must occur before leaving the designated area. Jewelry should be restricted. Equipment must be dedicated to the cohort area and not used outside the area (e.g., stethoscopes, electronic blood pressure machines or thermometers, blood glucose monitoring equipment, electronic lifts, bandage scissors)

Decolonization of patients/residents/clients or employees is not routinely recommended. This has not been proven to be an effective control measure.

### **Epidemiologic Investigation**

An internal working group should be organized to investigate the outbreak. Additionally, assistance may be sought from physicians specializing in infectious diseases or infection control, from certified infection preventionists, a reference laboratory or state health department representatives. The local and state health departments must be notified of the outbreak. Facts concerning the outbreak, such as the severity of the epidemic, methods of transmission and prevention and control measures, should be clearly communicated to all personnel of the facility. A written report of the outbreak should be completed promptly after the investigation is complete.

The epidemiologic investigation should include the following data:

- Patient/resident/client identifier (including age, sex, medical or admission number and race)
- Location in the institution (before and after cohorting)
- Diagnosis, especially those conditions with negative impact on patient/resident/client immune status
- Date of admission and recent hospitalizations
- Culture dates, sites and results
- Date when contact precautions were initiated in the facility
- Treatments given, especially antimicrobial therapy
- Health care providers involved in the care of the culture-positive patient
- Summary of interventions and outcomes.

In a rehabilitation (rehab) setting many different disciplines are involved in the care of the patient on a daily basis. This unique setting treats patients who need many different types of equipment and who usually have more than one disability or illness at the time of admission. Many patients have been reported to have one or more infections upon admission to the rehab setting. Currently, Standard Precautions with good hand hygiene should be used with all rehab patients.

Encouraging patient mobility, direction of care and physical independence is important and presents challenges in implementing recommended Contact Precautions. If a patient is known to be infected or colonized with MDROs, the interdisciplinary team, including the Infection Preventionist (IP), should review each case. This team will make decisions about care, point of service, and any needed restrictions that will be placed on the patient. Examples may include:

- Signs and symptoms of infection
- The ability to contain the patient's secretions and excretions
- The patient's ability to understand and follow basic hand hygiene guidelines.

Educating the patient, family and team members about MDROs and rationale for restrictions will facilitate compliance. Modifications in Contact Precautions allow for increased independence and mobility while providing preventative transmission measures.

## **Outbreak Management Updates**

This page intentionally left blank for future updates.

## Environmental (Housekeeping) Practices and Equipment

Standard and consistent environmental practices are important in managing patients/residents/clients with MDROs. Environmental cleaning and disinfecting aids in preventing cross-transmission of resistant microorganisms to people and to environmental items. Education of staff on MDROs' relationship to contaminated environments and cross-transmission is critical to compliance with housekeeping practices. Information taken from the [CDC Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008](#). (CDC Disinfect Guide, Rutala, W; Weber, D; Healthcare Infection Control Practices Advisory Committee (HICPAC), 2008).

MDROs have been recovered from bedrails, telephones, call lights, faucet handles, door knobs, chairs, wheelchairs, rectal/oral/ear-probe thermometers (especially the handle), over-the-bed tables, blood pressure cuffs, computer keyboards, pagers, cell phones and stethoscopes. The patients/residents environment is a reservoir for MDROs and appropriate cleaning is critical to prevent cross contamination.

### **Disinfectants:**

Non-critical items (items that come in contact with intact skin) or surfaces contaminated with resistant organisms do not require any special procedures for cleaning and disinfecting. Visibly soiled items need to be cleaned, using soap and water or a detergent solution, before disinfection. Hospital-grade intermediate or low-level disinfectants approved by the Environmental Protection Agency (EPA) are recommended. Many commercial products meet these requirements. Most Environmental Protection Agency (EPA)-registered disinfectants have a 10-minute label claim. Examples include: bleach (1 tablespoon of bleach in 1 quart of water), ethyl or isopropyl alcohol (70-90%) and hydrogen peroxide (3-6%). Phenolic disinfectants (such as Lysol and Pine Sol) and quaternary ammonium products may also be used. It is important to follow the manufacturer's recommendations for mixing; contact time and duration so that the chemical remains active (check expiration date on container and expiration date after mixing). Note that if bleach is used, it must be mixed fresh daily. Use bleach with caution, because it may be caustic to some metals and discolor fabrics.

### **Dusting / Disinfecting Environmental Surfaces:**

Regular, routine cleaning and disinfection of environmental surfaces and items is important in reducing cross-transmission of MDROs. The frequency of these activities needs to be based on assessment of each facility's environment. "Wet" dusting with disinfecting solution for contact precaution rooms may also be beneficial. This practice contains and manages dust particles. It also reduces the bioburden (concentration) of the resistant organisms on environmental items and surfaces. The duration of the disinfecting solution and cleaning cloth use needs to be assessed. Continued use of the same solution and cloths over time may allow these items to become over-burdened with germs. Once this occurs, the killing effect of the chemical is hindered. Common practice is to use the solution, cloth and mop head for only one contact precaution room (do not reuse them on another room). Stricter and more frequent environmental

cleaning and disinfecting practices should be considered during an outbreak or cluster of MDRO cases.

Toilets and commodes used by MDRO-infected or colonized patients/residents/clients should be cleaned when visibly soiled and disinfected daily with an EPA approved product. Hydrotherapy tubs/bathtubs should be disinfected after each patient/resident use. Health care facilities should follow equipment manufacturer's recommendations on type of disinfectant, mixing, contact time and expiration date(s) of disinfectant. The disinfecting solution level needs to cover the jets during disinfection. The jets should be operational to circulate the solution.

### **Patient / Resident Equipment**

Dedicated equipment for patients/residents/clients with MDRO infection or colonization is recommended. Examples include stethoscope, blood pressure cuff, computer, thermometer, weight scale and monitor cables. If supply inventory is an issue, items should be cleaned with soap and water, or detergent solution if visibly soiled, and disinfected before removal from the patient/residents room and prior to another person's use.

Examples of environmental services checklists can be found within the Institute for Health care Improvement's [5 Million Lives Campaign: Getting Started Kit: Reduce Methicillin-Resistant \*Staphylococcus aureus\* \(MRSA\) Infection How-to Guide](#).

### **Shared Bathrooms, Showers and Bathtubs**

When utilizing shared bathrooms, showers and bathtubs care must be taken to adequately clean and disinfect the sinks, showers and tubs to prevent spread of the disease.

- **Bathrooms** – When a patient/resident infected with a MDRO shares a bathroom with another patient/resident who does not have the same MDRO the bathroom is to be cleaned and disinfected daily and when visibly soiled. Commodes should *not* be shared, which may be useful in preventing the spread of the MDRO.
- **Showers and Bathtubs** – Showers and bathtubs are to be cleaned and disinfected after use by patients/residents with MDROs. Patients/residents with MDROs should be bathed after other residents.

### **Trash**

Trash is considered dirty, contaminated and non-biohazardous. For these reasons, protective barriers (e.g., gloves) are recommended for the process of collecting and discarding trash. Wash or sanitize hands after glove use. It is preferred to place dressings and items contaminated with body fluids in a small bag before putting them in regular trash. Special precautions are not necessary for MDRO trash, such as double bagging. Discourage all persons from searching through trash (e.g., for aluminum

cans). Items with blood and body fluids that drip, are pourable or flake upon drying should be discarded in a biohazardous-labeled container/bag.

## **Linen / Laundry**

Soiled linen should be contained or bagged at the location of use. Special precautions are not necessary for MDRO patients/residents dirty linen, such as double bagging. Use waterproof bags to contain fluids to prevent/reduce contamination of the environment and people. Do not sort or rinse soiled linens with body substances in patient care areas.

The antimicrobial action of the laundering process results from a combination of mechanical, thermal, and chemical factors. Dilution and agitation in water remove substantial quantities of microorganisms. Soaps and detergents function to suspend soils and also exhibit some microbicidal properties. Hot water provides an effective means of destroying microorganisms. A temperature of at least 160°F (71°C) for a minimum of 25 minutes is commonly recommended for hot-water washing. The use of chlorine bleach assures an extra margin of safety, and the temperatures reached in drying and especially during ironing provide additional significant microbicidal action. Facilities should follow local or state health department regulations for laundering. Linen handlers should wear protective barriers, which includes gloves, to prevent contamination from soiled linens. Soiled linens do not need to be washed separately. Wash or sanitize hands after glove use. Bleach may be added to wash cycle if linens are heavily soiled with body fluids.

## **Dishes / Eating Utensils**

Special precautions are not needed for dishes/eating utensils used by patients with MDRO infection or colonization. Used dishes are considered contaminated/dirty. Do not allow other people to use utensils or eat off MDRO infected or colonized patients/residents/clients serving dishes/tray. If patient's meals are served on a tray in the room, the used tray and dishes can be removed from the room and placed directly in the food cart. The cart/dishes will go through a sanitation process in the kitchen. Wash hands after placing dirty tray in the cart. Disposable dishes are not necessary. Do not take patient's water pitchers out of the room to be refilled. Instead, bring a disposable container (e.g., paper cup) of ice and water into the room, and/or refill the pitcher from the sink in the patient's room.

## **Home Care Items**

Because of the potential for environmental contamination, the health care worker should use barrier precautions as deemed necessary. For example, the nursing bag should be protected from the environment by a barrier. The HCW should remove from the bag the essential supplies needed for the visit and take them into the house. Dedicated equipment is ideal (see equipment section). Items need to be cleaned after use and between clients.

## **Environmental (Housekeeping) Practice Updates**

This page intentionally left blank for future updates.

# Acute Care Setting

## Admissions

Hospital admission because of a MDRO infection is appropriate in the medical plan of care. However, MDRO colonization does not, by itself, warrant a hospital admission. The treatment for infection with MDRO can be accomplished in the acute-care setting and can also be accomplished in a non-acute care facility or at home. Such decisions should be based on the clinical judgment of the attending physician.

## Patient Placement

The practice of cohorting (grouping patients with same infectious disease) MDRO patients to an assigned area of the facility (e.g., one clinical unit) with dedicated staff has been discussed in the literature as a strategy to control outbreak situations. This is not a prevention strategy due to logistical difficulties encountered, lack of availability to current MDROs laboratory resistant patterns (e.g., cultures with antibiotic sensitivity results) and lack of data confirming infection versus colonization status. These barriers are especially problematic for settings that do not have access to laboratory findings and access to patient private room accommodations.

The practice of cohorting MDRO patients as roommates remains an unresolved issue. The risk of transmitting a more virulent and/or different strain of the pathogen to the roommate is a concern. Infected patients are known to have a higher concentration of organisms than colonized patients. Compliance with standard precautions and hand hygiene is critical when providing care between roommates. Cohorting is a risk management issue that each facility should address, exploring the risks and the benefits.

Decisions about cohorting should include the following considerations:

- clinical diagnosis;
- microbiological results between roommates (e.g., culture results with similar antibiotic sensitivity patterns; current results more meaningful);
- epidemiology of involved MDRO including mode of transmission;
- presence of infection or colonization with other potentially transmissible microorganisms (e.g., MRSA patients should never cohort with a VRE patient);
- minimal likelihood of re-infection with the same organism;
- health status (immunocompromised);
- invasive devices;
- existing non-intact skin conditions;
- contained wound drainage;
- control over body excretions;
- the patient's ability and willingness to comply with preventative strategies.



## **Infection Control**

All acute care facilities should have an infection control plan in place and proper protocols for the prevention of spread of infectious agents. Please refer to the following sections: Precautions, Hand Hygiene, and Environmental for additional information regarding the proper handling of infectious agents.

### **Hand hygiene – See the Hand Hygiene Section**

#### **Additional precautions for Special Patient Populations:**

##### Patients with draining skin and decubiti lesions:

- Cover lesions whenever possible;
- Contain soiled dressings or linen in the appropriate leak-proof container or bag;
- If a patient is undergoing hydrotherapy for wound care of a lesion or decubitus, careful routine disinfection of equipment with an EPA approved disinfectant is indicated. Physical therapy staff must follow appropriate precautions when caring for the patient and cleaning equipment.

##### Patients with urinary catheters

- Change catheters when necessary, such as when they become crusted or clogged;
- Maintain a closed drainage system;
- Keep drainage tubing coiled and secured to bed or seat of wheelchair; do not allow tubing to hang below the level of the drainage bag;
- Keep drainage bags off the floor, but below the level of the patient's bladder;
- Use a separate collection container for each patient, and thoroughly clean it after each use. Avoid touching the catheter bag or drainage spout to the side of the graduate container;
- Cleanse the patient's perineal area daily and as necessary. Wear gloves during this procedure;
- Avoid tension or movement of the catheter by utilizing a securing device;
- Perform hand hygiene after manipulating the catheter system and glove removal.

## **Obstetrics (OB)**

If the OB patient reports a history of MDRO, she will be placed in contact precautions and plans made for the baby to stay with mom in her room. Mother and family will be instructed in appropriate hand hygiene. If mother requests the baby be placed in regular nursery, place baby in contact precautions (maintaining a distance greater than 3 feet from next baby).

## **Neonatal Intensive Care Unit (NICU)**

If the baby's mother reports a history of MDRO, baby may be placed in contact precautions. MDRO screening cultures may be indicated. Some hospitals isolate the baby of an MRSA positive mother.

### **Active Surveillance Cultures**

The practice of culturing patients upon admission, dismissal and on a periodic basis, as determined by the facility is active surveillance. This strategy helps detect asymptomatic carriers and identify transmission that takes place after admission to a given unit. Specimen collection is based on the type of MDRO, the collection site may be different. At a minimum, a swab may be collected from bilateral nares for MRSA or from the rectum with VRE.

- Active surveillance for the prevention of antimicrobial-resistant infections is usually associated with reports of outbreaks observed in high-risk patient care settings. Nearly all studies in non-outbreak settings have been directed at high-risk patients or hospital units. The few facilities performing whole-hospital surveillance generally recommended selected screening of high-risk patients. The appropriateness of generalizing the findings of targeted active surveillance studies during outbreaks or in high risk patient populations, to the management of endemic disease through the use of universal active surveillance screening is controversial.
- Cost effectiveness of active surveillance cultures has been demonstrated for some high-risk settings/patient populations or in units experiencing outbreaks. The extension of this to other settings such as long-term care facilities is less clear, and it is therefore premature to conclude this is a cost effective strategy. Whether hospitals, third party payors (including Medicare and Medicaid) or patients will pay for the cost of active surveillance cultures must be determined.
- SHEA and APIC support the continued development, validation and application of efficacious and cost effective strategies for the prevention of infections caused by MRSA, VRE, and other antimicrobial-resistant and susceptible pathogens.
- SHEA and APIC support stronger collaboration between state and local public health authorities and institutional infection prevention and control experts.
- While reducing the burden of antimicrobial-resistant pathogens, including MRSA and VRE is of preeminent importance, APIC and SHEA do not support legislation to mandate active surveillance cultures for MRSA, VRE or other antimicrobial-resistant pathogens.
- A more detailed explanation of this complex issue is summarized in the position statement from the Joint SHEA and APIC Task Force on Legislative Mandates for Active Surveillance Cultures of MRSA and VRE in the United States.

Resource: [The SHEA / APIC Position Statement](#). (Weber, et al., 2007)

The joint SHEA and APIC Task Force (2007) support ongoing additional research to determine and optimize the appropriateness, utility, feasibility, and cost effectiveness of using active surveillance cultures to screen both lower-risk and high-risk populations. High-risk patients may be defined as follows:

- Oncology patients;
- Transplant patients;
- Burn patients;
- Patients previously colonized or infected with an MDRO;
- Intensive Care Unit patients;
- Recently hospitalized patients;
- Long Term Care Facility residents; and
- Dialysis patient.

General risk factors for acquiring MRSA include:

- Hospital admission in the previous year with at least one underlying chronic illness;
- Admission to a nursing home in the previous year;
- Diagnosis of skin or soft-tissue infection at admission;
- HIV infection;
- Injection drug use;
- Previous MRSA infection or colonization; and
- Hemodialysis.

## **Decolonization**

Decolonization consists of treatment of MDRO patients for the eradication of the organism and elimination of that patient as a carrier. Successful decolonization of patients for VRE has been very limited; however, decolonization of MRSA in the nares has been proven possible using several treatments of topical mupirocin with or without a combination of oral antibiotics and the use of antimicrobial soap for bathing.

Routine use of decolonization treatments has not proven effective. Decolonization should be utilized on a case-by-case basis. Several factors limit the utility of decolonization on a routine basis. These factors include: 1) identification of patients for decolonization requires surveillance cultures; 2) patients receiving these treatments must receive follow-up cultures to provide proof of eradication; and 3) the patient may be resistant to the mupirocin treatment or emergence of resistance to the treatments may occur. Due to these limiting factors, most health care facilities limit the use of decolonization to MRSA outbreaks, or other high prevalence events; especially those situations effecting special-care units and health care personnel who have been colonized with MRSA and epidemiologically implicated in ongoing transmission of MRSA to patients.

## Activity Outside of the Patient Room

Factors to consider when making decisions about infection control measures include:

- Amount of patient care needs;
- Patient's ability to control secretions or excretions; and
- Patient's level of activity and mobility.

Limit the movement and transportation of patients from the room to essential purposes only (e.g., x-rays, tornados). This limitation reduces the risk of transmission of MDROs in the hospital setting. If transporting the patient is necessary, it is important that:

- Appropriate barriers are worn or used by the patient (e.g., masks if the patient has productive cough and poor compliance with respiratory etiquette, dressings that contain drainage);
- The patient wears a clean gown;
- Clean linen is in the wheel chair or on the cart;
- Personnel in the area receiving the patient should be informed of the arrival of the patient and the necessary precautions needed;
- Patients are informed of ways they can help in preventing the transmission of MDROs to others, (e.g., handwashing with antimicrobial soap or a "waterless" alcohol-based hand antiseptic before leaving the room); and
- Gloves, gowns and masks should *not be worn* outside the room by staff members, especially in public areas.

## Discharges / Transfers

Hospital discharge may be indicated upon completion of appropriate therapy for MDRO infection, and when clinical signs and symptoms have resolved (even if the patient still has a positive culture). A patient colonized with a MDRO while hospitalized for another illness may be discharged when the physician deems it appropriate.

While maintaining patient confidentiality, discussing the patient's status with the receiving facility prior to transfer is imperative to ensuring appropriate room placement and continuity of infection control measures. *It is the responsibility of the facility transferring the patient to inform a receiving facility and the transportation personnel of the patient's infection status and what precautions should be taken.*

A receiving facility that discovers a patient admitted from another institution is infected or colonized with a multidrug-resistant organism should inform the transferring institution so that follow-up actions can be taken.

*Communication between health care personnel concerning the patient's MDRO status is vital when preventing the spread of disease.*

*ALL health care personnel must report on any known disease status when transferring a patient.*

### To Another Acute Care Facility/Setting

Before transfer, the hospital should notify any institution/agency in advance that the patient they are sending is colonized with a MDRO. A negative culture is not required for transfer to another facility.

### To Non-Acute Care Facility/Setting

Before transfer, the hospital should notify any institution/agency in advance that the patient they are sending is colonized with a MDRO. A negative culture is not required for transfer to another facility.

### To Home Setting

The patient/family should be instructed concerning the following:

- Family members should wear gloves when handling secretions/excretions and should wash their hands with an antibacterial soap or a waterless alcohol-based hand rub after glove removal. When gloves have not been used, family members should wash hands after providing direct care and before preparing food or eating as described in teaching material (Appendices 1 & 2).
- Patient and family/caregiver should perform hand hygiene frequently.
- Patient and family members should make all health care providers aware of MDRO status.
- Special laundering procedures are not necessary unless there is heavy soiling with body secretions. One cup of household bleach added to the wash cycle, when feasible, may be beneficial.
- Household disinfectants should be used on frequently touched surfaces and items that may be contaminated by excretions/secretions.

The patient's family should understand that they rarely need to practice extraordinary infection control measures in the home beyond good hand hygiene and careful handling of soiled dressings. If there is a highly susceptible family member (e.g., diagnosed with HIV/AIDS, cancer, or who is immunocompromised) more extensive precautions may be in order and should be discussed with a physician prior to discharging a patient to a home setting (See Appendices 1 & 2– Living with MRSA and Living with VRE).

Resource: [APIC Guide to the Elimination of Methicillin-Resistant Staphylococcus aureus \(MRSA\) Transmission in Hospital Settings, 2007](#). (APIC Guide - MRSA in Hospital Settings, 2007)

## **Acute Care Setting Updates**

This page intentionally left blank for future updates.

# Long-term Care Setting

## Admission

MDRO status alone is not a reason to deny admission to a LTC setting. The treatment for infection with MDRO can usually be accomplished in the LTC setting, a non-acute care facility or even at home. Such decisions should be based on the clinical judgment of the attending physician and social worker.

Residents who are colonized or infected with certain microorganisms are, in some cases, restricted to their room. However, because of the psychosocial risks associated with such restriction, it has been recommended that psychosocial needs be balanced with infection control needs in the LTC setting.

An institution should not deny admission to a person colonized or infected with a MDRO. There should not be barriers to implementing infection prevention and control, regardless of the health care setting.

Under special circumstances, treatment for a MDRO infection can be accomplished in the LTC facility. This decision is based on clinical judgment of the attending physician and the capabilities of the institution. This should be negotiated between the discharging and receiving physicians and facilities.

## Room Assignment

The practice of cohorting residents with same infectious disease and/or MDRO to an assigned area of the facility (e.g., one clinical unit) with dedicated staff has been discussed in the literature as a strategy to control outbreaks. However, this is not a prevention strategy due to logistical difficulties encountered, lack of availability to current MDROs' laboratory resistant patterns (e.g., cultures with antibiotic sensitivity results) and lack of data confirming infection versus colonization status. These barriers are especially problematic for settings who do not have access to laboratory findings and access to resident private room accommodations.

The practice of cohorting MDRO residents as roommates remains an unresolved issue. The risk of transmitting a more virulent and/or different strain of the pathogen to the roommate is a concern. Infected patients are known to have a higher concentrations of organisms than colonized patients. Compliance with Standard Precautions and Hand Hygiene is critical when providing care between roommates. Cohorting is a risk management issue that each facility should address exploring the risks and the benefits. Seeking assistance from an infectious disease expert may be helpful.

Decisions concerning cohorting should take into consideration:

- clinical diagnosis;
- microbiological results between roommates (e.g., culture results with similar antibiotic sensitivity patterns; current results more meaningful);
- epidemiology of involved MDRO including mode of transmission;

- presence of infection or colonization with other potentially transmissible microorganisms (e.g., MRSA patients should never cohort with a VRE patient);
- minimal likelihood of re-infection with the same organism;
- health status (immunocompromised);
- invasive devices;
- existing non-intact skin conditions;
- contained wound drainage;
- control over body excretions; and
- the resident's and roommate's ability and willingness to comply with preventative strategies.

## **Infection Control**

Standard Precautions are used for all residents. Contact Precautions are used, in addition to Standard Precautions, for residents with MDROs whether infected or colonized (see Table 1). Compliance with infection control measures, including hand hygiene, is essential for an effective program.

### **Hand hygiene – See the Hand Hygiene Section**

#### **Activity Outside of the Room**

Factors to consider when making decisions about infection control measures include:

- Amount and type of resident care needs;
- Resident's ability to control secretions or excretions; and
- Resident's and roommate's level of activity and mobility.

The facility is considered the residents' home and may require a variety of precautions. Effective hand hygiene and Standard Precautions are currently the best methods of infection control in post-acute health care settings.

Long-term care residents with signs and symptoms of an infection should be restricted to their room using Contact Precautions until signs and symptoms are resolved. Residents colonized with MDROs should not be restricted from social or therapeutic group activities if their secretions and excretions can be contained and proper hand hygiene can be performed. There is no scientific evidence that supports the restriction of colonized residents from group activities as an effective way to control the transmission of MDROs.

In LTC facilities, consider the individual resident's clinical situation and prevalence or incidence of MDRO in the facility when deciding whether to implement or modify Contact Precautions in addition to Standard Precautions for a patient infected or colonized with a target MDRO. For relatively healthy residents (e.g., mainly independent) follow Standard Precautions, making sure that gloves and gowns are used



for contact with uncontrolled secretions, pressure ulcers, draining wounds, stool incontinence, and ostomy tubes/bags.

For MDRO colonized or infected patients without draining wounds, diarrhea, or uncontrolled secretions, establish ranges of permitted ambulation, socialization, and use of common areas based on their risk to other residents and on the ability of the colonized or infected residents to observe proper hand hygiene and other recommended precautions to contain secretions and excretions. "[Management of Multidrug-Resistant Organisms in Healthcare Settings 2006](#)" (CDC MDRO Guide - Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L., 2006)

## **Discharges / Transfers**

Long Term Care discharge may be indicated upon completion of appropriate therapy for MDRO infection, and when clinical signs and symptoms have resolved (even if the patient still has a positive culture). A patient colonized with a MDRO residing at a Long Term Care facility for treatment of another illness may be discharged or transferred when the physician deems it appropriate.

*Communication between health care personnel concerning the resident's MDRO status is vital when preventing the spread of disease.*

*All health care personnel must report on any known disease status when transferring a resident.*

### To Another Acute Care Facility/Setting

Before transfer, the LTC facility should notify any institution/agency in advance that the resident they are sending is colonized with a MDRO. A negative culture is not required for transfer to another facility. (See Appendix 11 for an example Transfer Form).

### To Non-Acute Care Facility/Setting

Before transfer, the LTC facility should notify any institution/agency in advance that the resident they are sending is colonized with a MDRO. A negative culture is not required for transfer to another facility.

### To Home Setting

The resident/family should be provided the following information:

- Family members should wear gloves when handling secretions/excretions and should wash their hands with an antibacterial soap or a waterless alcohol-based hand rub after glove removal. When gloves have not been used, family members should wash hands after providing direct care and before preparing food or eating as described in teaching material.
- Resident and family/caregiver should perform hand hygiene frequently;
- Resident and family members should make all health care providers aware of MDRO status;

- Special laundering procedures are not necessary unless there is heavy soiling with body secretions. Bleach added to the wash cycle, when feasible, may be beneficial; and
- Household disinfectants should be used on frequently touched surfaces and items that may be contaminated by excretions/secretions.

The resident's family should understand that they rarely need to practice extraordinary infection control measures in the home beyond good hand hygiene and careful handling of soiled dressings. If there is a highly susceptible family member (e.g., diagnosed with HIV/AIDS or cancer) more extensive precautions may be in order and should be discussed with a physician prior to resident discharge (See Appendices 2 and 3 – Living with MRSA and Living with VRE).

### **SUMMARY of KEY ISSUES RELATED to ADMISSIONS and DISCHARGES**

The following statements summarize key issues regarding discharge/admission management of MDRO residents/patients in acute and non-acute care facilities:

- MDRO status alone is not a reason to deny admission to a health care facility/setting.
- Private room assignment is preferred. Cohorting may be necessary in some circumstances. Please refer to Precautions Section of this document for cohorting/roommate selection information.
- Colonization with a MDRO does not require the extension of hospitalization. Arrangements for discharge to home or a non-acute care facility can proceed as the resident's condition warrants.
- Compliance with infection prevention and control measures, including hand hygiene, is essential to an effective program.

### **Readmission of Patients**

MDRO infected or colonized residents may be re-admitted to the same health care facility, regardless if it is acute or non-acute. All health care facilities should maintain records of such residents and be able to "flag" either the medical records or the computer system to alert the facility of the resident's MDRO status and any special precautions needed.

Resource: [APIC Guide to the Elimination of Methicillin-Resistant Staphylococcus aureus \(MRSA\) in the Long-Term Care Facility, 2009](#). (APIC - Guide for LTC, 2009)

## **Long Term Care Setting Updates**

This page intentionally left blank for future updates.

# Rehabilitation Setting

## Admission

MDRO status alone is not a reason to deny admission to a rehabilitation setting. The treatment for infection with MDRO can be accomplished in the rehabilitation setting. However, the treatment for an infection can also be accomplished in a non-acute care facility or at home. Such decisions should be based on the clinical judgment of the attending physician.

Residents who are colonized or infected with certain microorganisms are, in some cases, restricted. However, because of the psychosocial risks associated with such restriction, it has been recommended that psychosocial needs be balanced with infection control needs in the rehabilitation setting.

An institution should not deny admission to a person colonized or infected with a MDRO. There should not be barriers to implementing infection prevention and control practices, regardless of the health care setting.

Under special circumstances, treatment for a MDRO infection can be accomplished in the Rehabilitation facility. This decision is based on clinical judgment of the attending physician and the capabilities of the institution. This should be negotiated between the discharging and receiving physicians and facilities.

## Room Assignment

The practice of cohorting residents with same infectious disease and/or MDRO to an assigned area of the facility (e.g., one clinical unit) with dedicated staff has been discussed in the literature as a strategy to control outbreaks. However, this is not a prevention strategy due to logistical difficulties encountered, lack of availability to current MDROs' laboratory resistant patterns (e.g., cultures with antibiotic sensitivity results) and lack of data confirming infection versus colonization status. These barriers are especially problematic for settings who do not have access to laboratory findings and access to resident private room accommodations.

The practice of cohorting MDRO residents as roommates remains an unresolved issue. The risk of transmitting a more virulent and/or different strain of the pathogen to the roommate is a concern. Infected patients are known to have a higher concentration of organisms than colonized patients. Compliance with Standard Precautions and Hand Hygiene is critical when providing care between roommates. Cohorting is a risk management issue that each facility should address exploring the risks and the benefits. Seeking assistance from an infectious disease expert may be helpful.

Decisions concerning cohorting should take into consideration:

- clinical diagnosis;
- microbiological results between roommates (e.g., culture results with similar antibiotic sensitivity patterns; current results more meaningful);
- epidemiology of involved MDRO including mode of transmission;

- presence of infection or colonization with other potentially transmissible microorganisms (e.g., MRSA patients should never cohort with a VRE patient);
- minimal likelihood of re-infection with the same organism;
- health status (immunocompromised);
- invasive devices;
- existing non-intact skin conditions;
- contained wound drainage;
- control over body excretions; and
- the resident's and roommate's ability and willingness to comply with preventative strategies.

## **Infection Control**

Rehabilitation facilities should have an infection control plan and instill proper steps in preventing the spread of infection to staff and patients. Standard Precautions are used for all patients. Contact Precautions are used, in addition to Standard Precautions, for patients with MDROs, whether infected or colonized (see Table 1). Compliance with infection control measures, including hand hygiene, is essential to an effective program.

### **Hand hygiene – See the Hand Hygiene Section**

Factors to consider when making decisions about infection control measures include:

- Amount and type of resident care needs;
- Resident's ability to control secretions or excretions; and
- Resident's and roommate's level of activity and mobility.

The facility is considered the residents' home and may require a variety of precautions. Effective hand hygiene and Standard Precautions are currently the best methods of infection control in post-acute health care settings.

Long-term care residents with signs and symptoms of an infection should be restricted to their room using Contact Precautions until signs and symptoms are resolved. Residents colonized with MDROs should not be restricted from social or therapeutic group activities if their secretions and excretions can be contained. There is no scientific evidence that supports the restriction of colonized residents from group activities as an effective way to control the transmission of MDROs.

In LTC facilities, consider the individual resident's clinical situation and prevalence or incidence of MDRO in the facility when deciding whether to implement or modify Contact Precautions in addition to Standard Precautions for a patient infected or colonized with a target MDRO. For relatively healthy residents (e.g., mainly independent) follow Standard Precautions, making sure that gloves and gowns are used for contact with uncontrolled secretions, pressure ulcers, draining wounds, stool incontinence, and ostomy tubes/bags.

For MDRO colonized or infected patients without draining wounds, diarrhea, or uncontrolled secretions, establish ranges of permitted ambulation, socialization, and use of common areas based on their risk to other residents and on the ability of the colonized or infected residents to observe proper hand hygiene and other recommended precautions to contain secretions and excretions. "[Management of Multidrug-Resistant Organisms in Healthcare Settings 2006](#)" (CDC MDRO Guide - Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L., 2006)

## **Discharges / Transfers**

Long Term Care discharge may be indicated upon completion of appropriate therapy for MDRO infection, and when clinical signs and symptoms have resolved (even if the patient still has a positive culture). A patient colonized with a MDRO residing at a Long Term Care facility for treatment of another illness may be discharged or transferred when the physician deems it appropriate.

*Communication between health care personnel concerning the resident's MDRO status is vital when preventing the spread of disease.*

*ALL health care personnel must report on any known disease status when transferring a resident.*

### To Another Acute Care Facility/Setting:

Before transfer, the LTC facility should notify any institution/agency in advance that the resident they are sending is colonized with a MDRO. A negative culture is not required for transfer to another facility.

### To Non-Acute Care Facility/Setting:

Before transfer, the LTC facility should notify any institution/agency in advance that the resident they are sending is colonized with a MDRO. A negative culture is not required for transfer to another facility.

### To Home Setting:

The resident/family should be provided the following information:

- Family members should wear gloves when handling secretions/excretions and should wash their hands with an antibacterial soap or a waterless alcohol-based hand rub after glove removal. When gloves have not been used, family members should wash hands after providing direct care and before preparing food or eating as described in teaching material.
- Resident and family/caregiver should perform hand hygiene frequently.
- Resident and family members should make all health care providers aware of MDRO status.

- Special laundering procedures are not necessary unless there is heavy soiling with body secretions. Bleach added to the wash cycle, when feasible, may be beneficial.
- Household disinfectants should be used on frequently touched surfaces and items that may be contaminated by excretions/secretions.

The resident's family should understand that they rarely need to practice extraordinary infection control measures in the home beyond good hand hygiene and careful handling of soiled dressings. If there is a highly susceptible family member (e.g., diagnosed with HIV/AIDS or cancer) more extensive precautions may be in order and should be discussed with a physician prior to resident discharge.

(See Appendices 2 and 3 – Living with MRSA and Living with VRE).

## **SUMMARY of KEY ISSUES RELATED to ADMISSIONS and DISCHARGES**

The following statements summarize key issues regarding discharge/admission management of MDRO residents/patients in acute and non-acute care facilities:

- MDRO status alone is not a reason to deny admission to a health care facility/setting.
- Private room assignment is preferred. Cohorting may be necessary in some circumstances. Please refer to Precautions Section of this document for cohorting/roommate selection information.
- Colonization with a MDRO does not require the extension of hospitalization. Arrangements for discharge to home or a non-acute care facility can proceed as the resident's condition warrants.
- Compliance with infection prevention and control measures, including hand hygiene, is essential to an effective program.

### **Readmission of Patients**

MDRO infected or colonized residents may be re-admitted to the same health care facility, regardless if it is acute or non-acute. All healthcare facilities should maintain records of such residents and be able to "flag" either the medical records or the computer system to alert the facility of the resident's MDRO status and any special precautions needed.

## Rehabilitation Setting Updates

This page intentionally left blank for future updates.



## Mental Health Setting

Psychiatric hospitals serve a diverse group of people, including children and young adults with mental illness, forensic patients from jails/prisons, the elderly mentally ill with various medical issues, and traumatic brain-injured persons. The duration of care ranges from short term or diagnostic only to life-long custodial care.

Infection and colonization of patients in behavioral health facilities with multidrug-resistant organisms (MDROs) is becoming commonplace. In caring for a psychiatric patient with an MDRO, actions to limit the spread must take into account the patient's physical functioning, mental status and psychological needs. Precautions can be used and modified as necessary to remain compatible with the plan of care. There are circumstances that are unique to the psychiatric facility and these are discussed below, along with general guidelines to be followed by all facilities.

Multi-drug-resistant organisms (MDROs) are transmitted primarily via contaminated hands. The *single most effective* means of reducing the potential for MDRO transmission is hand hygiene (destroying or removing transient microorganisms from the hands). *Wearing gloves does not replace the need for hand hygiene.*

### Hand hygiene – See the Hand Hygiene Section

Hand hygiene must be performed before and after contact with *all* patients, including after glove removal. Hands must be washed with soap and water if the hands are visibly soiled (i.e. there is *visible* blood, fecal material, dirt, or other material on the hands). If the hands are *not* visibly soiled, either wash hands with soap and water or apply an alcohol-based hand rub when available.

### Standard Precautions

Standard Precautions should be used during all encounters with all patients/clients. These precautions are based on the assumption that any patient or client can be carrying an infectious microorganism of which neither the patient nor health care provider is aware (See Appendix 8 - Behavioral Health Checklist).

### Standard Precautions consist of the following components:

- Hand hygiene as described above.
- Single-use disposable gloves must be worn whenever contact with patients' blood, body fluids, or moist body surfaces or contact with contaminated surfaces is anticipated or likely. Gloves must be changed between dirty and clean tasks and hand hygiene must be carried out when gloves are removed.
- Masks and eye protection or face shields must be worn whenever splashing is likely.
- Gowns or protective aprons are to be worn when personal clothing may be soiled.
- Regularly dispose of or clean patient care equipment and environmental surfaces with an EPA-registered disinfectant.
- Contaminated linen should be handled with gloves and kept away from the caregiver's own clothing. Soiled linen should be bagged as close to the point of use as possible.
- Patients/residents with poor hygienic practices who contaminate the environment may require additional precautions.

- Safe disposal of sharps, including needles, must be accomplished according to the facility protocol, the OSHA Blood and Bloodborne Pathogens Standard and state and local regulations.

### **Special Concerns Encountered in the Psychiatric Setting**

- Assess if acceptable to place stationary, alcohol-based hand rub dispensers with high risk psychiatric patients
- Hand hygiene should be practiced not only by health care workers but by psychiatric patients as well. Alcohol-based hand rubs are extremely useful and should be encouraged for patients and health care workers when available.
- If a private room is not available, a patient with an MDRO should be placed with a roommate who is not immunocompromised and does not have any open wounds or invasive devices. (Appendix 8 – Behavioral Health Checklist).
- Housekeeping staff should be instructed to clean rooms of patients infected with MDROs *last*, so that contaminated end-of-day/shift cleaning equipment is laundered before next use.
- If possible, dedicate equipment such as a stethoscope and blood pressure cuff to the patient with an MDRO. If dedicating equipment is not possible, disinfecting after use is essential. Communal geriatric chairs should also be disinfected after each use.
- Patients with MDROs can participate in communal activities if the secretions/excretions can be contained adequately to prevent spread. This depends upon the site of infection and patient's self-care abilities.
- If the site of MDRO infection is a wound, a wound dressing must be in place to contain drainage.
- If the site of MDRO infection is stool or urine and the patient is incontinent, they should be clean and wear an incontinence product when leaving his/her room. It is preferable that personal hygiene take place in the patient's room rather than in a communal bathroom.
- All residents with MDROs should perform hand hygiene and wear clean clothes when leaving their rooms.
- A patient with an MDRO in the sputum should be evaluated for presence of cough and ability to control the cough. It may be necessary to restrict movement outside the room until active coughing is controlled.
- An ambulatory, confused patient who frequently touches an infected wound requires special attention. If keeping the patient in his/her room causes undue mental trauma, extra attention to environmental cleaning and hand hygiene is needed.
- For patients who use communal showers, spray the shower stall down with a disinfectant before the next person's use.
- Rehabilitation and recreation staff must have access to cleaning supplies and disinfectants to clean equipment after each use.
- Leather restraints: cleaning protocols should already be in place and must be followed when used on a patient with an MDRO infection. If available and safe, non-leather restraints are preferable because they can be machine-washed and dried.

## **Mental Health Setting Updates**

This page intentionally left blank for future updates.

# Outpatient Clinic / Ambulatory Care Setting

## Infection Control Plan

It is recommended that each office/clinic develop a comprehensive, written Infection Control Plan. It should include a surveillance plan for identifying and monitoring infections and for preventing transmission between patients, staff, volunteers and/or visitors. The plan should include policies regarding hand hygiene, education, and environmental cleaning. Reporting of communicable diseases as required by the state and local health departments must also be included in the plan. A member of the staff should be responsible for overseeing, reviewing and approving the activities of the infection control program.

In 2000, there were 83 million visits to hospital outpatient clinics and more than 823 million visits to physician offices. Ambulatory care now accounts for most patient encounters with the health care system. In these settings, adapting transmission prevention guidelines is challenging because patients remain in common areas for prolonged periods waiting to be seen by a health care provider or awaiting admission to the hospital, examination or treatment rooms are turned around quickly with limited cleaning, and infectious patients may not be recognized immediately. Furthermore, immunocompromised patients often receive chemotherapy in infusion rooms where they stay for extended periods of time along with other types of patients.

There are few data on the risk of MDROs in ambulatory care settings, with the exception of hemodialysis centers. Transmission of infections in outpatient settings has been reviewed in three publications. Goodman and Solomon summarized 53 clusters of infections associated with the outpatient setting from 1961-1999. [“Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Health care Settings 2007”](#) (CDC Isolation Guide, Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L., 2007). Overall, 29 clusters were associated with common source transmission from contaminated solutions or equipment, 14 with person-to-person transmission from or involving health care personnel and ten associated with airborne or droplet transmission among patients and health care workers. Transmission of bloodborne pathogens (e.g., hepatitis B and C viruses and, rarely, HIV) in outbreaks, sometimes involving hundreds of patients, continues to occur in ambulatory settings. These outbreaks often are related to common source exposures, usually a contaminated medical device, multi-dose vial, or intravenous solution. In all cases, transmission has been attributed to failure to adhere to fundamental infection control principles, including safe injection practices and aseptic technique. This subject has been reviewed and recommended infection control and safe injection practices summarized.

Airborne transmission of *M. tuberculosis* and measles in ambulatory settings, most frequently emergency departments, has been reported. Measles virus was transmitted in physician offices and other outpatient settings during an era when immunization rates were low and measles outbreaks in the community were occurring regularly. Rubella has been transmitted in the outpatient obstetric setting. In the ophthalmology setting, adenovirus type 8 epidemic keratoconjunctivitis has been transmitted via incompletely

disinfected ophthalmology equipment and/or from health care workers to patients, presumably by contaminated hands.

If transmission in outpatient settings is to be prevented, screening for potentially infectious symptomatic and asymptomatic individuals, especially those who may be at risk for transmitting airborne infectious agents (e.g., *M. tuberculosis*, varicella-zoster virus, rubeola [measles]), is necessary at the start of the initial patient encounter. Upon identification of a potentially infectious patient, implementation of prevention measures, including prompt separation of potentially infectious patients and implementation of appropriate control measures (e.g., Respiratory Hygiene/Cough Etiquette and Transmission-Based Precautions) can decrease transmission risks. Transmission of MRSA and VRE in outpatient settings has not been reported, but the association of CA-MRSA in health care personnel working in an outpatient HIV clinic with environmental CA-MRSA contamination in that clinic, suggests the possibility of transmission in that setting. Patient-to-patient transmission of *Burkholderia species* and *Pseudomonas aeruginosa* in outpatient clinics for adults and children with cystic fibrosis has been confirmed. Standard precautions (see below) should be used for all patients. Patients with productive coughs, draining wounds or other signs and symptoms of infection may need to be placed in an exam room as soon as possible and not in the waiting room. If a patient has been identified with a MDRO, subsequent visits to the office/clinic should be managed carefully. Surfaces that may have had contact with the patient (e.g., blood pressure cuffs, examination table, stethoscopes) should be cleaned with an EPA-registered disinfectant prior to use for another patient. [Reference: List H: EPA's Registered Products Effective Against Methicillin Resistant Staphylococcus aureus \(MRSA\) and Vancomycin Resistant Enterococcus faecalis or faecium \(VRE\).](#) (US Environmental Protection Agency - Office of Pesticide Programs, 2009)

## **Hand hygiene – See the Hand Hygiene Section**

### **Standard Precautions**

Standard Precautions are designed to incorporate the protection against blood-borne pathogens achieved by *Universal Precautions* and the protection against other pathogens achieved by *Body Substance Isolation*. Standard Precautions are to be used for *all* patients, regardless of their diagnosis or presumed infectious status, when the health care worker comes into contact (or is at risk for contact) with any of the following: (1) blood, (2) all body fluids, secretions and excretions except sweat, (3) mucous membranes, and (4) non-intact skin.

### **Standard precautions consist of the following components:**

- Hand hygiene should be performed before and after all patient contact.
- Single use disposable gloves must be worn whenever contact with patients' blood, body fluids or moist body surfaces or contact with contaminated surfaces is anticipated or likely. Gloves must be changed between dirty and clean tasks and hand hygiene must be performed when gloves are removed.

- Masks, eye protection, or face shields must be worn whenever splashing or splatter is likely.
- Gowns or protective aprons are to be worn when personal clothing may be soiled.
- Regular cleaning or disposal of patient care equipment and environmental surfaces with an EPA-registered disinfectant
- Contaminated linen should be handled with gloves and kept away from the caregiver's own clothing. Soiled linen should be bagged as close to the point of use as possible.
- Patients with poor hygienic practices who contaminate the environment may require additional precautions.
- Safe disposal of sharps, including needles, must be accomplished according to the facility protocol, the OSHA Blood and Bloodborne Pathogens Standard, and state and local regulations
- Family members should wear gloves when handling secretions/excretions and should wash their hands with an antibacterial soap or a waterless alcohol-based hand rub after glove removal. When gloves have not been used, family members should wash hands after providing direct care and before preparing food or eating as described in teaching material.
- Patient and family/caregiver should perform hand hygiene frequently.
- Patient and family members should make all health care providers aware of MDRO status.
- Special laundering procedures are not necessary unless there is heavy soiling with body secretions. Bleach added to the wash cycle, when feasible, may be beneficial.
- Household disinfectants should be used on frequently touched surfaces and items that may be contaminated by excretions/secretions.

### Patient / Family Education

The patient and the patient's family should understand that they rarely need to practice extraordinary infection control measures in the home beyond good hand hygiene and careful handling of soiled dressings. If there is a highly susceptible family member (e.g., diagnosed with HIV/AIDS, cancer, or who is immunocompromised) more extensive precautions may be in order and should be discussed with a physician prior to patient discharge (See Appendices 1 & 2 – Living with MRSA and Living with VRE).

## **Outpatient Clinic / Ambulatory Care Setting Updates**

This page intentionally left blank for future updates.

# Outpatient Dialysis Setting

## Infection Control

Meticulous infection prevention and control is critical to protecting hemodialysis patients. An infection control program should be in place and periodically reviewed. Staff, patients, and families should receive education regarding infection prevention. Tracking patients' infections should also be included in the infection prevention and control plan.

## Hand hygiene – See the Hand Hygiene Section

Multidrug-resistant organisms (MDROs) are transmitted primarily via contaminated hands. The *single most effective* means of reducing the potential for MDRO transmission is hand hygiene (destroying or removing transient microorganisms from the hands). *Wearing gloves does not replace the need for hand hygiene.*

**Hand hygiene must be performed before and after contact with all patients, including after glove removal.** Hands must be washed with soap and water if the hands are visibly soiled (e.g., there is *visible* blood, fecal material, dirt, or other material on the hands). If the hands are *not* visibly soiled, either hand hygiene or applying a waterless, alcohol-based hand rub to hands.

## Standard Precautions – Please Read the Standard Precautions Section

The following infection control precautions should be used with *all* hemodialysis patients:

- Wear disposable gloves when caring for the patient or touching the patient's equipment at the dialysis station; remove gloves and perform hand hygiene between each patient and/or station.
- Items taken into the dialysis station should be disposable, dedicated for single patient use, or cleaned and disinfected before used on another patient.
- Non-disposable items that cannot be cleaned and disinfected (e.g., adhesive tape, cloth-covered blood pressure cuffs) should be dedicated for use only on a single patient.
- Unused medications (including multiple dose vials containing diluents) or supplies (syringes, alcohol swabs, etc.) taken to the patient's station should be used only for that patient and not returned to a common clean area or used on other patients.
- If multiple dose medication vials are used (including those containing diluents), prepare individual patient doses in a clean, centralized area away from dialysis stations and deliver separately to each patient. Do not carry multiple dose medication vials from station to station.
- Do not use common medication carts to deliver medications to patients. Do not carry medication vials, syringes, or medical supplies in pockets. If trays are used to deliver medication to individual patients, they must be cleaned between patients.



- Clean areas should be clearly designated for preparation, handling and storage of medications, including unused supplies and equipment. Clean areas should be clearly separated from contaminated areas where used supplies and equipment are handled. Do not handle and store medications or clean supplies in the same or an adjacent area where used equipment or blood samples are handled.
- Use external venous and arterial pressure transducer filters/protectors for each patient treatment to prevent blood contamination of the dialysis machines' pressure monitors. Change filters/protectors between each patient treatment, and do not reuse them. Internal transducer filters do not need to be changed routinely between patients.
- Clean and disinfect the dialysis station (chairs, beds, tables, machines, etc.) between patients.
- Give special attention to cleaning control panels on the dialysis machines and other surfaces that are frequently touched and potentially contaminated with patients' blood.
- Discard all fluid. Clean and disinfect all surfaces and containers associated with the prime waste (including buckets attached to the machines).
- For dialyzers and blood tubing that will be reprocessed, cap dialyzer ports and clamp tubing. Place used dialyzer and tubing in a leak-proof container for transport from station to reprocessing or disposal area.
- Masks, eye protection, or face shields must be worn whenever splashing is likely.
- Gowns or protective aprons should be worn when personal clothing may be soiled.
- Contaminated linen should be handled with gloves and kept away from the caregiver's own clothing. Soiled linen should be bagged as close to the point of use as possible.
- Safe disposal of sharps, including needles, must be accomplished according to the facility protocol, the OSHA Blood and Bloodborne Pathogens Standard, and state and local regulations.

### **Precautions for Patients with MDROs**

Additional precautions are required for patients who are at risk for transmitting MDROs. Such patients include those who have either:

- An infected skin wound with drainage that is not contained by dressings, or
- Fecal or urinary incontinence or diarrhea uncontrolled with personal hygiene measures.

These additional precautions include:

- Dialyze the patient at a station with as few adjacent stations as possible (e.g., at the end or corner of the unit).
- Strict adherence to performing hand hygiene between patient contacts is critical.
- Dialyze patients with the same MDRO in one area of the dialysis unit as much as possible (do *not* place VRE and MRSA patients together)

- Caregivers should wear gloves and an impermeable gown over their usual clothing and remove gloves and the gown when finished caring for the MDRO patient.
- Provide adequate staff to ensure the caregiver of a MDRO patient does not need to respond to emergencies with other patients.
- When practical, have caregivers provide care
  - (1) only to patients with the same MDRO, or
  - (2) to patients *without* MDROs. This assists with preventing transmission of MDROs between patients.
- Instructor assist patient to perform hand hygiene after using the toilet or touching body fluids or drainage.

Reference: [Recommendations for Preventing Transmission of Infections Among Chronic Hemodialysis Patients.](#) (CDC - MMWR Report - Hemodialysis, 2001)

# Outpatient Dialysis Setting Updates

This page intentionally left blank for future updates.

## Home Health / Hospice Setting

Home health care workers should focus on preventing cross-transmission via the clinical bag, clothing, and equipment that is carried to and from the home by the health care worker. Alternatively, the clinical bag may be left in the vehicle and only the disposable items used for the patient carried into the home. In general, reusable equipment must be cleaned either in the patient's home or bagged before returning to the health care worker's vehicle or facility. If potentially contaminated items from a patient's home must be transported by the caregiver, a designated "dirty area" in the vehicle should be maintained to achieve separation from clean items. Hand hygiene must be performed prior to entering and before leaving the home. Environmental culturing is not necessary in the home environment.

### Hand hygiene – See the Hand Hygiene Section

Multidrug-resistant organisms (MDROs) are transmitted primarily via the contaminated hands of staff. The *single most effective* means of reducing the potential for MDRO transmission is hand hygiene (destroying or removing transient microorganisms from the hands). *Wearing gloves does not diminish the need for hand hygiene.*

Hand hygiene must be performed upon entering and leaving the patient's home. Hand hygiene with soap and water should be performed when hands are visibly soiled and paper towels used to dry care givers' hands. The patient's or family member's towels should not be used for hand washing. Alcohol based hand rubs may be used when hands are not visibly soiled. If sinks and running water are unavailable, use alcohol hand rub agents.

### Barriers

Gloves should be used by home health nurses when providing direct patient contact. Family members and other care providers should also be instructed on appropriate use of gloves in the home (e.g., direct patient care and handling of potentially infected secretions). Gowns should be worn if there is risk of soiling with any body fluid.

### Care of Equipment

Disinfect the stethoscope, thermometer, glucometer, and any other reusable equipment with an EPA-registered disinfectant before returning these items to the bag. Use disposable items or dedicate equipment to the patient to be left in the home for the duration of treatment whenever possible. The home care provider should establish a safe working surface by placing a barrier, such as paper towels or newspapers, between environmental surfaces and the care provider's supply bag.

## Education of Patient and Family

- Teach basic infection prevention and control concepts and procedures, including glove use and hand hygiene.
- Teach patient and/or caregiver to change and immediately wash clothing if it becomes soiled with body fluid using appropriate hand hygiene.
- Promptly clean and disinfect bathrooms and other environmental surfaces that may become contaminated with fecal material or other patient secretions.

If the patient has an MDRO, people with the following health conditions should not visit the patient's home:

- Recent *major* surgery (such as a transplant, open heart surgery);
- Chemotherapy or radiation therapy;
- Immunosuppression; and
- Currently or recently on long-term antibiotics.

## Home Health / Hospice Setting Updates

This page intentionally left blank for future updates.

# Correctional Setting

## Infection Control

Upon suspicion of a communicable disease, a healthcare provider must examine the inmate promptly. The inmate should be separated from other inmates until a determination is made as to the necessity for and type of precautions required. When the need for contact precautions has been identified, all personnel must carefully comply with posted precautions.

If possible, an inmate with an MDRO should be accommodated in a separate room/cell with a separate toilet, sink, soap dispenser and disposable towels. *Hand hygiene is the single most important means of preventing the spread of infection.* Soap, water and towels must be readily available.

Precautions to be used for inmates with MDROs include:

- Staff and visitors must perform hand hygiene before entering and immediately after leaving the inmate's room/cell;
- Instruct the inmate to perform hand hygiene before leaving the room/cell and any time the hands are contaminated with wound drainage (this should be observed and documented for compliance);
- Use gloves whenever contact with the inmate's blood, body fluids, moist body surfaces or contact with contaminated surfaces is anticipated or likely. Gloves must be changed between tasks and hand hygiene must be carried out when gloves are removed;
- Masks, eye protection, or face shields must be worn whenever splashing or splatter of body fluids is likely;
- Gowns or protective aprons are to be worn when staff clothing may become soiled with the inmate's body fluids;
- Cleaning of medical equipment must be performed between uses;
- Disposable of medical equipment is advised for the MDRO inmate;
- Cleaning of environmental surfaces must be performed on a routine schedule;
- Linen contaminated with body fluids should be handled with gloves and bagged at point of use;
- Inmates with poor hygiene practices who contaminate the environment may require additional precautions;
- Clean clothes and linens should be provided on a regular basis;
- Every inmate should have his/her own toothbrush, toothpaste, comb and razor; These items must not be shared with anyone;
- Procedures to allow inmates proper management of personal items and disposal of waste are recommended.

## Hand hygiene – See the Hand Hygiene Section

Resource: [Correctional Health Care: Guidelines for the Management of an Adequate Delivery System; 2001 Edition](#). (U.S. Department of Justice - National Institute of Corrections, 2001)

## Correctional Setting Updates

This page intentionally left blank for future updates.



# Nebraska Guidelines for the School, Athletic and Child Care Setting

[GUIDELINES FOR SCHOOL HEALTH SERVICES IN NEBRASKA: METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS \(MRSA\) IN SCHOOLS, ATHLETICS, AND CHILD CARE, FEBRUARY 2008.](#) (Karsting & DHHS, 2008).

## **INTRODUCTION: COMMUNITY-ASSOCIATED MRSA**

Historically speaking, methicillin resistant *Staphylococcus aureus* (MRSA) emerged in hospital settings, and in patients with a recent history of hospital-associated care. It wasn't until the 1990s that MRSA began to appear with increasing frequency in hospital emergency rooms and doctors offices without any relation to prior hospital exposure.

MRSA in schools, child cares, and youth athletics mirrors the emerging phenomenon of community-acquired ([CA- MRSA in the United States](#)). Most recent figures from CDC report (CDC - CA-MRSA in the U.S.) (Hageman J. , 2005):

- Approximately 32% (89.4 million persons) and 0.8% (2.3 million persons) of the U.S. population is colonized with *S. aureus* and MRSA respectively.
- 94,000 invasive MRSA infections in the U.S. occur each year, with approximately 19,000 associated deaths. Of these, 86% are health care-associated and 14% are community-associated. (Klevens, et al., 2007).
- In 2004, approximately 76% of purulent skin and soft tissue infections (SSTIs) in adults seen in 11 emergency departments were caused by *S. aureus*. Of these infections, 78% were caused by MRSA and overall MRSA caused 59% of all SSTIs.

MRSA occurs with increasing frequency in schools and child care settings. Young age is a factor in risk of disease because the “five C’s” of MRSA transmission are fulfilled (Gorwitz, 2007) (CDC - Q&A MRSA in Schools, 2007). (4)

- Crowding
- Frequent skin-to-skin contact
- Compromised skin (cuts or abrasions)
- Contaminated items and surfaces
- Lack of cleanliness.

Locations where the 5 C’s are common include schools, dormitories, military barracks, households, correctional facilities, and daycare centers (CDC - Q&A MRSA in Schools, 2007). Clearly, children are very well represented in the populations of concern.

Few outbreaks of MRSA have been reported in schools and child care settings, while single cases have been identified. Outbreaks among student athletes, however, are considerably more frequently described. Little has been published about colonization rates specifically in non-hospitalized pediatric populations (CDC - MRSA in Athletics, 2010).

## **RECOMMENDED RESOURCES:**

Centers for Disease Control and Prevention:

<http://www.cdc.gov/mrsa/prevent/index.html>

Nebraska Department of Health and Human Services:

<http://www.dhhs.ne.gov>

Other state health departments:

<http://www.health.state.mn.us/divs/idepc/dtopics/athlete>

[http://www.health.state.ny.us/diseases/communicable/staphylococcus\\_aureus/methicillin\\_resistant/community\\_associated/](http://www.health.state.ny.us/diseases/communicable/staphylococcus_aureus/methicillin_resistant/community_associated/)

Making fresh bleach solution and using it safely:

<http://emergency.cdc.gov/disasters/pdf/flyer-clean-with-bleach.pdf>

<http://emergency.cdc.gov/disasters/pdf/bleach.pdf>

<http://www.cdc.gov/healthyswimming/bodyfluidspill.htm>

## School Setting

MRSA may come to the attention of the school when –

- ✓ a child with special medical needs attends with hospital-associated MRSA
- ✓ a student athlete or cluster of athletes is diagnosed with MRSA, or
- ✓ when a case of severe invasive infection arises in the approximately 1% of the population estimated to be colonized with MRSA.

Preventing transmission in the school community focuses on basic infection control considerations.

1. Emphasize good hand hygiene for all, and ensure access to equipment, supplies, and opportunities for hand hygiene (Commonwealth of Massachusetts Department of Public Health, 2008).
2. Cover all skin lesions and wounds with clean dry bandages until healed.
3. Maintain a clean environment by establishing cleaning procedures for frequently touched surfaces and surfaces that come into direct contact with people's skin (CDC - Q&A MRSA in Schools, 2007).
4. Routine housekeeping procedures (using a freshly prepared solution of commercially available cleaner such as detergent, disinfectant-detergent, or chemical germicide) are adequate for *clean up* of spills of vomitus, urine, and feces (Maryland State Department of Education, 2006).
5. If cleanup involves fluid from wounds, blood, or fluids containing blood, the area should also be *disinfected* using a freshly prepared bleach solution. Solid and liquid materials should be cleaned from the surface prior to disinfection.
6. A bleach solution made fresh from 1 part household bleach to 9 parts clean water is adequate for disinfection of clean (i.e. solid or other material removed) surfaces. Additional resources for making fresh bleach solution and using it safely for cleaning and disinfection purposes can be found at the following sites.
7. School health personnel should be alert to the types of wounds that may be considered suspicious for staph infection and possible MRSA. These include folliculitis, boils, scalded skin syndrome, impetigo, toxic shock syndrome, and cellulitis. Infections of the skin are most common, and cause symptoms such as redness, warmth, pus, and a wound that does not heal (Virginia Department of Health, 2007). Fever may or may not be present. Physician evaluation may be recommended (HealthFinder, 2008).
8. Keep all wounds and other lesions covered at school, by clothing or dressing held securely in place.

When a student is diagnosed with MRSA, the following considerations may be helpful in guiding enrollment and placement decisions:

- Children who are colonized with MRSA need not (should not) be excluded from the classroom (Stokowski, 2006). Since the prevalence of MRSA is increasing in the community, it is likely that there are colonized students in the classroom who are not aware they harbor the organism. Thus, excluding a child known to be colonized with MRSA would be relatively ineffective. The risk for acquisition of MRSA in the classroom is no greater than the risk of contracting a skin infection caused by other pathogens (Indiana State Department of Health, 2008).

- Exclusion considerations will apply to the child who is symptomatically ill with infection (Stokowski, 2006).
- If attending school, students with active infections should be excluded from specific activities where skin-to-skin contact is likely to occur (e.g., sports) until infections are healed (CDC - Q&A MRSA in Schools, 2007).
- Exclusion from school may be applied for those with wound drainage that cannot be covered and contained with a clean, dry bandage and for those who cannot maintain good personal hygiene (CDC - Q&A MRSA in Schools, 2007), (Nebraska Statute 79-248, 2010), (Nebraska Statute 79-264, 2010).
- If wound care is provided at school, bandages are disposed of in a manner that does not expose others to contamination. Persons who provide wound care should wear gloves (and gowns as needed) and practice diligent handwashing (Stokowski, 2006).
- Additional considerations may apply to the needs of the student with medical conditions resulting in immune system suppression. Children colonized with MRSA should not be placed in classrooms with, or have direct contact with, children who have immune system suppression (Stokowski, 2006) (Maryland State Department of Education, 2006).
- When the school receives notification that a child with MRSA will be present at school, the school nurse should perform an assessment:
  - child's age
  - when the child was found to be infected or colonized
  - whether the child currently has signs of infection
  - site of infection
  - child's underlying medical problems and current health status
  - route of transmission of the bacteria
  - specific needs and characteristics of the child, including mobility status and availability of dedicated personnel to care for the child
  - susceptibility to infection of other persons who are likely to be exposed to the carrier
  - precautions that need to be taken to minimize or eliminate the risk of transmission, and the ability of the program to implement these precautions (consider staff training/scope of practice issues).
  - verify diagnosis and determine current colonization status
  - monitor ongoing colonization status.
  - Diligently follow standard infection control precautions (Maryland State Department of Education, 2006).
- Report an outbreak of infection – more than one case - to the local public health department (California Childcare Health Program, 2007).

Effective prevention of transmission of MRSA among school-aged populations occurs at the individual and community levels (Gorwitz, 2007) (Hageman J. , 2005):

- Persons with skin infections should
  - keep wounds covered
  - wash hands frequently (after touching infected skin or changing dressings)
  - dispose of used bandages in trash, and
  - avoid sharing personal items.

- Uninfected persons can minimize risk of infection by
  - keeping cuts and scrapes clean and covered
  - avoiding contact with other persons' infected skin
  - washing hands frequently
  - avoiding sharing personal items (towels, razors) that come in contact with bare skin, and
  - using a personal barrier (clothing or a towel) between skin and shared equipment such as weight training benches or mats (CDC - Q&A MRSA in Schools, 2007).
  
- Exclusion of patients from school, work, sports activities, etc., should be reserved for those who are unable to keep the infected skin covered with a clean, dry bandage and maintain good personal hygiene.
- In ambulatory care settings, use standard precautions for all patients (hand hygiene before and after contact, barriers such as gloves, gowns as appropriate for contact with wound drainage and other body fluids).
  
- Schools, child care providers, and athletics programs should develop a plan for responding to MRSA concerns (Hageman J. , 2005): The plan should include:
  - Input from administrators, coaches, school health personnel, staff
  - Reporting procedures for skin infections (e.g., who, what, when, how) and wounds (e.g., turf burns, scrapes)
  - Education plan for participants/attendees
  - Schedule for cleaning equipment and environmental surfaces
  - Criteria for excluding a person from activities (e.g., competition).
  
- In general, it is not necessary to close schools for special disinfection events when MRSA infections occur. More important are the daily cleaning and decontamination practices at the school, personal hand washing behaviors of students and staff, and policies/procedures related to individuals with skin infections.
- Strategies focusing on increased awareness, early detection and appropriate management, enhanced hygiene, and maintenance of a clean environment have been successful in controlling clusters/outbreaks of infection.
  - Communication and collaboration with local and state level public health are encouraged when local entities such as schools face disease reports or possible outbreaks.

**Hand hygiene – See the Hand Hygiene Section**

## Athletic Setting

Close physical contact, a break in the skin, and sharing equipment and clothing place student athletes at additional risk of MRSA transmission (Stokowski, 2006), (Indiana State Department of Health, 2008). The risks for transmission of MRSA are much greater among sports participants than among students in a classroom.

Basic infection control practices for athletics settings include implementing environmental sanitation measures and personal behaviors (Tacoma-Pierce County Health Department, 2008). All must be consistently practiced and enforced in order to be effective:

- All environmental hard surfaces that may come in contact with body fluids should be cleaned daily and sanitized with disinfectant approved by the Environmental Protection Agency, including benches, weights, workout machines, etc. Find more information about the EPA approved list: [EPA's Registered Sterilizers, Tuberculocides, and Antimicrobial Products Against Certain Human Public Health Bacteria and Viruses](#). (U.S. Environmental Protection Agency, 2009)
- Ensure that athletic areas, locker rooms and restrooms all have separate cleaning mops and buckets. Clean all mops and buckets regularly.
- Locker rooms, including shower areas, should be washed daily, if used.
- All floors/wall padding in athletic settings should be washed daily, if used.
  - Clean and sanitize wrestling mats before and after practice and matches.
  - Use dedicated mop heads to clean mat surfaces.
- Place wall dispensers with 60% or greater alcohol-based hand sanitizer at entrances/exits inside weight room. Staff must be role models for use.
- Review condition of equipment:
  - Remove tape from weight bars and grips. Replace with solid material grip that can be regularly and thoroughly wiped down and disinfected.
  - Wipe down grips on weights and lifting belts at least daily.
  - Replace torn and worn out padding and covers.
- After each use, clean and sanitize sports equipment that comes in direct contact with the skin of players, such as wrestling headgear, football helmets and fencing equipment (including wires) (Tacoma-Pierce County Health Department, 2008).
- If soap is furnished for athlete use, it should not be bar soap and should be accessible from a wall dispenser.

Adolescents may need education, supervision, and support in order to learn and consistently practice the personal behaviors which contribute significantly to reduced disease transmission:

- Do not share towels.
- Do not share water bottles.
- Wash or sanitize hands frequently.
- Shower thoroughly with soap and water after every practice or match.
- Avoid common water tubs. If used, assure procedures are in place to enforce showering before use and frequent routine cleaning of the tub.
- Report skin infections to parent and/or coach.

Open communication with parents/guardians about precautionary measures is vital for consistent implementation of preventive measures.

- Inform parents/guardians of precautionary measures.
  - Describe precautions for athlete health and safety.
  - Describe signs of skin infections.
  - Identify reporting procedures: primary care provider, coach, school nurse.
  - Describe exclusion from play/return to play decisions (Hageman J. , 2005).
- Educate parents and athletes about appropriate use of antibiotics:
  - Follow the label instructions.
  - Take all prescribed doses, unless told by your doctor to discontinue, even if the infection is better.
  - Never share medicine with others.
  - Never save unused medicine to use at another time (Hageman J. , 2005).

Considerations for athletes with skin infections, including MRSA:

- Exclude from play the athlete with mild-to-moderate draining skin infections. The athlete may return to play 72 hours after initiation of therapy, given clinical improvement and no new skin lesions for 48 hours, or when infection is resolved (Benjamin, Nikore, & Takagishi, 2007).
- Return to play decisions for the athlete with severe skin infection or wound must involve the licensed medical provider who will provide documentation of medical clearance, as well as significant visual evidence, that infection is resolved and the wound is healed.
- If athletes are cleared to participate, all wounds should be completely covered with an occlusive dressing before and during sports participation. Multiple wound checks should be performed to assure an intact dressing that has not shifted in position during competition (Benjamin, Nikore, & Takagishi, 2007).
- If leakage of the dressing occurs, or the dressing cannot be maintained intact during play, the athlete should be removed from competition (Tacoma-Pierce County Health Department, 2008). The athlete may return when the wound has been cleansed with soap and water and a new dressing applied.
- An athlete with a healing wound may also return to participation with a lesion that has developed a firm intact crust and no signs of infection remain.
- Provide continuity of management of skin infections of athletes. The athlete who receives intermittent, sporadic care from a variety of ambulatory care or urgent care sources, without a medical home, is at particular risk for development of severe or resistant infection (Anderson, 2007)
- CDC recommends the following measures for preventing MRSA transmission among sports participants (Stokowski, 2006), (Indiana State Department of Health, 2008), (Recommendations for Placement of Children with Methicillin Resistant Staphylococcus aureus (MRSA) in School and Child Care Settings, 2003)

- Schools, child care providers, and athletics programs should develop a plan for responding to MRSA concerns (Hageman J. , 2005). The plan should include:
  - Input from administrators, coaches, school health personnel, staff
  - Reporting procedures for skin infections (e.g., who, what, when, how) and wounds (e.g., turf burns, scrapes)
  - Education plan for participants/attendees
  - Schedule for cleaning equipment and environmental surfaces
  - Criteria for excluding a person from activities (e.g., competition).
- A coach or athletic trainer should check athletes for skin infections before practice or games/matches, and refer the athlete with a potential skin infection to their medical provider (Tacoma-Pierce County Health Department, 2008).
- Cover all wounds. If a wound cannot be covered adequately, consider excluding players with potentially infectious skin lesions from practice or competitions until the lesions are healed or can be covered adequately.
- Encourage good hygiene, including showering and washing with soap, after all practices and competitions.
- Frequent handwashing should be encouraged and expected.
- Ensure availability of adequate liquid soap (not shared bar) and hot water.
- Discourage sharing of towels and other personal items such as clothing or equipment.
- Discourage cosmetic shaving (Anderson, 2007).
- Provide adequate supervision to enforce policies and procedures designed to impact disease transmission: showering, keeping wounds covered (Hageman J. , 2005).
- Establish routine cleaning schedules for shared equipment, including mats.
- Train athletes and coaches in first aid for wounds and recognition of wounds that are potentially infected.
- Encourage athletes to report skin lesions to coaches and encourage coaches to assess athletes regularly for skin lesions.



## Child Care Setting

MRSA infections among healthy young children are becoming more and more common. Children at highest risk of MRSA are those who

- ✓ have been hospitalized recently
- ✓ have been in with contact with someone colonized with MRSA, or who have an active MRSA infection.

Children in child care also are at risk of transmission because of the close contact with other children and caregivers (Abrams, 2007-2008).

Basic infection control considerations for those working in child care environments include:

- Handwashing is the most effective method of preventing the spread of MRSA and other infections (California Childcare Health Program, 2007).
- Keep cuts and scrapes covered until healed. Keep infected wounds covered with clean dry bandages.
- Don't share personal items such as towels and bedding.
- First clean then disinfect surfaces and items that may be soiled with body fluids or secretions (Maryland State Department of Education, 2006).
- A bleach solution made fresh from 1 part household bleach to 9 parts clean water is adequate for disinfection of clean (i.e. solid or other material removed) surfaces. See resources in Introduction section for websites that provide instruction for making fresh bleach solution and using it safely.

Considerations for the child with MRSA in child care (California Childcare Health Program, 2007), (Recommendations for Placement of Children with Methicillin Resistant Staphylococcus aureus (MRSA) in School and Child Care Settings, 2003).

- Children known to be colonized with MRSA in the nose or skin do not need to be excluded from the child care.
- Children known to be colonized with MRSA who have draining wounds or skin sores should be excluded from child care if the wounds cannot be covered, contained, or dressing maintained intact and dry.
- The decision to exclude an individual child with MRSA from child care should involve the child's primary health care provider. Factors to consider include:
  - does the child have draining wounds?
  - does the child have draining wounds that cannot be covered?
  - if dressings are needed to contain the drainage and keep wound covered, can the dressings be kept dry and intact, or are special strategies needed? If needed, can they be implemented by the child care staff reliably?
  - in addition to the child with MRSA in a classroom, are there other children who are immune-suppressed? Children known to be colonized with MRSA should not be placed in classrooms with children who have severe immune system suppression.
  - does the child with MRSA have other special needs?
- Toys receive additional consideration. If a child colonized with MRSA is of an age to mouth toys or is teething, can adequate strategies be implemented to sequester this child's toys for cleaning and otherwise contain saliva?

- Notify the parents or guardians of children in your program that you are caring for a child with MRSA, and all at the center will be practicing excellent infection control practices. MRSA can be a problem for immune suppressed individuals in families in ways the child care provider may not be aware of.

Preventing transmission of MRSA in child care settings involves a high level of active involvement by personnel:

- Frequent handwashing with soap and running water for at least 20 seconds. Regularly clean and sanitize toys and surfaces. No sharing of washcloths and towels. Good hygiene practices with bandage care and disposal. Wear gloves
- Teach children: hand hygiene; not to share personal items such as towels and bedding; not to touch other people's wounds or bandages.
- Teach parents:
  - To seek medical attention if a child has a boil, red or inflamed skin, or has a sore that does not go away or that does not respond to antibiotics.
  - To share information about the child's medical treatment with caregivers
  - To keep draining wounds covered with clean dry dressings.
  - To place soiled dressings in a separate bag and close the bag before disposing of them.
  - Wash sheets, towels, and clothes when soiled with drainage in hot water and dry in hot dryer [Child Care Health Connections](#) (California Childcare Health Program, 2007).
  - To use antibiotics correctly (Hageman J. , 2005):
    - Follow the label instructions.
    - Take all the prescribed doses, unless told by your doctor to discontinue, even if the infection is better.
    - Never share medicine with others.
    - Never save unused medicine to use at another time.
- Schools, child care providers, and athletics programs should develop a plan for responding to MRSA concerns (Hageman J. , 2005). The plan should include:
  - Input from administrators, staff, parents
  - Communication procedures for skin infections (e.g., who, what, when, how) and wounds (e.g., bites, scrapes)
  - Education plan for parents and children
  - Schedule for cleaning equipment and environmental surfaces
  - Criteria for excluding a person from activities.
- Report outbreaks of infection to the local public health department (California Childcare Health Program, 2007). An outbreak is more than one case.

## **Schools, Athletics and Child Care Setting Updates**

This page intentionally left blank for future updates.

.

# Veterinary Setting

## Hand hygiene – See the Hand Hygiene Section

To protect animal health and ensure a readily available and wholesome food supply the use of antimicrobials in Veterinary Medicine is critical. The Veterinarian is trained to diagnose animal disease, select the appropriate therapeutic antimicrobial, determine dosage, monitor response and counsel regarding drug withdrawals before slaughter. In advancing this goal, the Nebraska Department of Health and Human Services Antibiotic Resistance Taskforce, recommends Veterinarians prescribe antimicrobials based on the American Veterinary Medical Association (AVMA) Policy on Judicious Therapeutic Use of Antimicrobials. The document reprinted below can be found at the AVMA website, [www.avma.org](http://www.avma.org)

## Judicious Therapeutic Use of Antimicrobials

(Oversight: FSAC; Approved by the AVMA Executive Board, November 1998; Revised April 2004, November 2008)

### Position Statement

When the decision is reached to use antimicrobials for therapy, veterinarians should strive to optimize therapeutic efficacy and minimize resistance to antimicrobials to protect public and animal health.

### Objectives

Support development of a scientific knowledge base that provides the basis for judicious therapeutic antimicrobial use. Support educational efforts that promote judicious therapeutic antimicrobial use. Preserve therapeutic efficacy of antimicrobials. Ensure current and future availability of veterinary antimicrobials.

### Strategies

Facilitate development and distribution of appropriate antimicrobial use guidelines by practitioner species-interest groups. Improve scientifically based therapeutic practices through education.

### Recognized Needs

Improved monitoring and feedback systems for antimicrobial use and resistance patterns. Research to improve scientifically based therapeutic practices.

### Judicious Use Principles

Preventive strategies, such as appropriate husbandry and hygiene, routine health monitoring, and immunization, should be emphasized.

Other therapeutic potions should be considered prior to antimicrobial therapy.

Judicious use of antimicrobials, when under the direction of veterinarian, should meet all requirements of a veterinarian – client – patient relationship.

Extralabel antimicrobial therapy must be prescribed only in accordance with the Animal Medicinal Drug Use Clarification Act amendments to the Food, Drug, and Cosmetic Act and its regulations.

Veterinarians should work with those responsible for the care of animals to use antimicrobials judiciously regardless of the distribution system through which the antimicrobial was obtained.

Regimens for therapeutic antimicrobial use should be optimized using current pharmacological information and principles.

Antimicrobials considered important in treating refractory infections in human or veterinary medicine should be used in animals only after careful review and reasonable justification. Consider using other antimicrobials for initial therapy.

Use narrow spectrum antimicrobials whenever appropriate.

Utilize culture and susceptibility results to aid in the selection of antimicrobials when clinically relevant.

Therapeutic antimicrobial use should be confined to appropriate clinical indications. Inappropriate uses such as for uncomplicated viral infections should be avoided.

Therapeutic exposure to antimicrobials should be minimized by treating only for as long as needed for the desired clinical response.

Limit therapeutic antimicrobial treatment to ill or at risk animals, treating the fewest animals indicated.

Minimize environmental contamination with antimicrobials whenever possible.

Accurate records of treatment and outcome should be used to evaluate therapeutic regimens.

In this context, this principle takes into account development of resistance of cross resistance to important antimicrobials.

**Extralabel Use**—extralabel use means actual use or intended use of a drug under veterinary direction, in an animal in a manner that is not in accordance with the approved labeling. This includes, but is not limited to, use in species not listed in the labeling, use for indications (disease or other conditions) not listed in the labeling, use at dosage levels, frequencies, or routes of administration other than those stated in the labeling, and deviation from the labeled withdrawal time based on these different uses.

**Veterinarian/Client/Patient Relationship (VCPR)** -- A VCPR exists when all of the following conditions have been met:

1. The veterinarian has assumed the responsibility for making clinical judgments regarding the health of the animal(s) and the need for medical treatment, and the client has agreed to follow the veterinarian's instructions.
2. The veterinarian has sufficient knowledge of the animal(s) to initiate at least a general or preliminary diagnosis of the medical condition of the animal(s). This means that the veterinarian has recently seen and is personally acquainted with the keeping and care of the animal(s) by virtue of an examination of the animal(s) or by medically appropriate and timely visits to the premises where the animal(s) are kept.
3. The veterinarian is readily available for follow-up evaluation, or has arranged for emergency coverage, in the event of adverse reactions or failure of the treatment regimen.

**Veterinary Feed Directive (VFD) Drug** – The VFD category of medicated feeds was created by the Animal Drug Availability Act of 1996 to provide an alternative to prescription status for certain therapeutic animal pharmaceuticals for use in feed. Any animal feed bearing or containing a VFD drug shall be fed to animals only by or upon a lawful VFD issued by a licensed veterinarian in the course of the veterinarian's professional practice.

## **Veterinary Setting Updates**

This page intentionally left blank for future updates.

# Animals in Healthcare Settings

## Animals in Service

Animal-Assisted Activities (AAA) and Animal-Assisted Therapies (AAT) are those programs that enhance the patients' quality of life. These programs allow patients to visit animals in either a common, central location in the facility or in individual patient rooms.

The most important infection-control measure to prevent potential disease transmission is strict enforcement of hand-hygiene measures (e.g., using either soap and water or an alcohol-based hand rub) for all patients, staff, and residents after handling the animals. Care should also be taken to avoid direct contact with animal urine or feces. Clean-up of these substances from environmental surfaces requires gloves and the use of leak-resistant plastic bags to discard absorbent material used in the process. The area must be cleaned after visits according to standard cleaning procedures. [CDC Guidelines for Environmental Infection Control in Health-Care Facilities, 2003](#) (CDC Environmental Guide, 2003).

The following information is summarized from the following:

1. Chapter 68: Animals Visiting Healthcare Facilities from the APIC TEXT of Infection Control and Epidemiology, 3<sup>rd</sup> Edition. (APIC - TEXT, 2009), and
2. AJIC Major Article: Guidelines for animal-assisted interventions in health care facilities. (Lefebvre, et al., 2008).

### Animal Guidelines:

1. Animal must be domestic companion animal. Exclude the following:
  - a. Nonhuman primates
  - b. Reptiles and amphibians
  - c. Hamsters, gerbils, mice and rats
  - d. Prairie dogs, hedgehogs
  - e. Animals not "potty trained"
2. Must not be a resident (or in past 6 months) in an animal shelter.
3. Must be at least 1 year old. (Dogs preferably 2 years old)
4. Must be registered or certified for AAA/AAT.
5. Must pass health, skills, aptitude, and temperament tests.
6. Records of animal's health must be up-to-date.
7. Must be appropriately restrained or on a short leash. Identification items (badge, vest, bandanas) may be required.
8. Must never be left alone with patient.
9. Must be restricted from these areas at all times:
  - a. Food preparation areas or carts,
  - b. Medication preparation, storage or cart areas
  - c. Operating rooms
  - d. Neonatal nurseries,
  - e. Dialysis or burn unit, except under special circumstances, and
  - f. Other high risk areas as determined by the facility.
10. Must not have been fed raw foods of animal origin within previous 90 days.



# Animals in Healthcare Settings

## Infection Prevention and Safety Guidelines:

1. Facility develops policies and guidelines for the safety of patients and animals. Facility should designate someone to implement policies and coordinate activities.
2. Animals must have a temperament evaluation (behavioral assessment) by an experienced person or recognized group. Should assess the following reactions to: strangers, loud or novel stimuli, angry voices, threatening gestures, crowding, being patted vigorously or in a clumsy manner, retraining hugs, other animals and ability to obey handler's commands.
3. Animals should be reevaluated at least every 3 years or after an absence greater than 6 months.
4. Require suspension of visits and have a reevaluation completed if the animal demonstrates any of the following:
  - a. Negative behavioral change
  - b. Aggressive behavior outside health care setting
  - c. Fearful behavior during visit
  - d. Loss of sight or hearing.
5. Requiring that cats be declawed to prevent scratches is NOT recommended.
6. Animals are required to be bathed within 24 hours of visit.
7. Animals may wear clothing to control allergies.
8. Animals must have clean ears.
9. Animals must have short nails with no rough edges and trained not to scratch.
10. Animals must be healthy and have proof of current immunizations; including rabies plus those required in each state.
11. Animals are required to have a health evaluation by a licensed veterinarian at least once (preferably twice) per year.
12. Annual exams should include dental, dermatological evaluation and free of communicable diseases/parasites and on a flea control program.
13. Animals must be free of any skin conditions or wounds.
14. Handlers must ensure the animal will not lick or come into contact with patient wounds or devices.
15. Animals allowed in patient's bed will have a barrier such as disposable cloth, towel, or sheet between the animal's coat and patient's linen. Remove and discard barrier at end of visit.
16. Animals are kept on short leash, in a carrier or basket.
17. Handler/volunteer must be healthy and free of communicable disease. Facility is strongly encouraged to recommend / require a free influenza vaccination to handler.
18. When visit is finished, the patient must wash their hands or use hand sanitizer.

## Patient Suitability Guidelines:

1. Ask the patient if they want to interact with the animal or have allergies or phobias to animals.
2. Exclude patients with:
  - a. Allergies to animals,
  - b. Open wounds or burns,
  - c. Immunosuppression (as defined by the facility AAA/AAT program),
  - d. Agitation or aggression, or

## Animals in Healthcare Settings

- e. Transmission precautions or isolation of any kind.
3. Exclude patients who are infected with:
  - a. Tuberculosis
  - b. *Salmonella*
  - c. *Campylobacter*
  - d. Shigella
  - e. *Streptococcus A*
  - f. MRSA
  - g. Ringworm
  - h. *Giardia*, and
  - i. Amebiasis
4. Special Requirements
  - a. An altered level of consciousness or coma may require consent from Family.
  - b. Pediatric patient interactions require verbal consent from parent/guardian and written consent for therapy.
  - c. Wounds (not open) or healed burns must be covered during the visit. Animal must not come in contact with these areas.
  - d. If visit allowed for a patient with a tracheotomy must have the area completely covered.
  - e. If visit is allowed in the ICU, guidance and assistance from patient's nurse regarding the best way to approach the patient and avoid all devices/equipment.
5. Hand hygiene must be practiced before and after animal contact, including handler, patient, staff, and visitors. Handlers may carry sanitizer they can offer to all that pet the animal.

### Handler / Volunteer Guidelines:

1. Require that every handler of AAA animals participate in a formal training program.
2. Require handler complies with facilities' policies regarding patient confidentiality.
3. Work with the staff to determine how the animal's interaction will benefit the patient.
4. Handler must be observed by an AAA program representative at least once before being granted final approval to visit.
5. Neither the handler nor the animal may visit if either is ill.
6. Make sure the animal has had a chance to eliminate before entering the facility.
7. Restrict visit sessions to a maximum of one animal per handler for one hour.
8. Do not visit a patient while they are eating.
9. Must focus on the animal and remove the animal from any stressful situation. Make sure animal has water and elimination breaks, elimination must be properly disposed of in bad and handler's hands washed.
10. In the case of a urinary or fecal accident, immediately terminate the visit.
11. Investigate all bite or scratch incidents and report them to the health care staff and appropriate authorities. This may be grounds for dismissal from the program.

### Personal Pets:

1. Must be bathed within past 24 hours.
2. A record for current vaccination should be provided prior to visit.
3. Must be on a short leash or in a carrier. Retractable leashes not allowed.

## Animals in Healthcare Settings

4. The pet must be escorted into and out of the facility by designated staff.
5. The pet must not be allowed to interact with other patients or visitors.
6. Visits are limited per facility policy based on predetermined factors (facility specific).
7. The handler and patient must be informed prior to the visit that they may be asked to remove the animal from the facility at any time.

### Infection Prevention and Safety Consideration Regarding Service Animals:

1. Healthcare providers are required to make their goods and services available to the handler accompanied by a service animal without isolating, segregating, or otherwise discriminating against the person.
2. A service animal may be restricted or denied access to areas only when it can be demonstrated that the presence or behavior of the animal would create a fundamental alteration or a direct threat to other persons or to the nature of the goods and services provided.
3. If healthcare personnel, visitors, and patients are permitted in an area without taking additional precautions to prevent the spread of infection (gloves, gown or mask), then a healthy, clean, well-behaved service animal should be allowed with handler.
4. The healthcare facility CANNOT ask for the immunization records of a service animal. The service animal can be removed, restricted or denied access if they have a condition that presents a direct threat to the health and safety of others.
5. For help determining what information can be obtained about the service animal, the healthcare provider can consult the U.S. Department of Justice ADA information line for guidance about initiating restrictive policies. ADA specialists are available Monday through Friday from 9:30 AM - 5:30 PM (ET) except Thursday 12:30 PM - 5:30 PM. Spanish language service is also available. Call: 1-800-514-0301 (voice) or 1-800-514-0383 (TTY). (Department of Justice, 2010).

## References

Abrams, E. (2007-2008, December - January: Volume 11, Issue 1). Managing MRSA in Childcare. Retrieved from Healthy Child Care:  
[http://www.healthychild.net/InSicknessandHealth.php?article\\_id=415](http://www.healthychild.net/InSicknessandHealth.php?article_id=415)

Anderson, B. (2007, July 31). Retrieved from CA-MRSA: Clinical Update - Review of CA-MRSA for Providers and Medical Staff and Am I Really Disqualified?: PowerPoint presentation.

APIC - Greater Omaha. (2010). Nebraska MDRO Guidelines 2010. Retrieved from  
<http://www.goapic.org/newforms.htm>

APIC - Guide for LTC. (2009). APIC Guide to the Elimination of Methicillin-Resistant Staphylococcus aureus (MRSA) in the Long-Term Care Facility, 2009.  
[http://www.apic.org/Content/NavigationMenu/PracticeGuidance/APICEliminationGuides/MRSA\\_in\\_LTC\\_09.pdf](http://www.apic.org/Content/NavigationMenu/PracticeGuidance/APICEliminationGuides/MRSA_in_LTC_09.pdf)

APIC - TEXT. (2009). Volume II Scientific and Practice Elements: Animals Visiting Healthcare Facilities. In APIC TEXT of Infection Control and Epidemiology, 3rd Edition (3rd ed., Vol. II, pp. 68-1 - 68-8).

APIC Guide - MRSA in Hospital Settings. (2007). Guide to the Elimination of Methicillin-Resistant Staphylococcus aureus (MRSA) Transmission in Hospital Settings. Retrieved from  
[http://www.apic.org/Content/NavigationMenu/PracticeGuidance/APICEliminationGuides/mrsa\\_elim\\_guide.pdf](http://www.apic.org/Content/NavigationMenu/PracticeGuidance/APICEliminationGuides/mrsa_elim_guide.pdf)

APIC - C diff. (2008). Guide to the Elimination of Clostridium difficile in Healthcare Settings. APIC Elimination Guide . Retrieved from  
[http://www.apic.org/Content/NavigationMenu/PracticeGuidance/APICEliminationGuides/C.diff\\_Elimination\\_guide\\_logo.pdf](http://www.apic.org/Content/NavigationMenu/PracticeGuidance/APICEliminationGuides/C.diff_Elimination_guide_logo.pdf)

Benjamin, H., Nikore, V., & Takagishi, J. (2007). Practical Management: Community-Associated Methicillin-Resistant Staphylococcus Aureus (CA-MRSA): The Latest Sports Epidemic. Clinical Journal of Sport Medicine , 17 (5), 393-397.

California Childcare Health Program. (2007, Jan-Feb). Child Care Health Connections. Retrieved from  
[http://www.ucsfchildcarehealth.org/pdfs/newsletters/2007/Jan\\_Feb\\_07.pdf](http://www.ucsfchildcarehealth.org/pdfs/newsletters/2007/Jan_Feb_07.pdf)

CDC - CA-MRSA in the U.S. (2010). Retrieved from <http://www.cdc.gov/mrsa/index.html>

CDC - Lab Detection - MRSA. (2010). CDC Laboratory Detection of Oxacillin/Methicillin-resistant Staphylococcus aureus. Retrieved from <http://www.cdc.gov/mrsa/lab/lab-detection.html>

CDC - Lab Detection - VRE. (2010). Vancomycin-resistant Enterococci (VRE) and the Clinical Laboratory. Retrieved from <http://www.cdc.gov/HAI/settings/lab/VREClinical-Laboratory.html>

CDC - MMWR Report - Hemodialysis. (2001). Recommendations for Preventing Transmission of Infections Among Chronic Hemodialysis Patients. Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5005a1.htm>

CDC - MRSA in Athletics. (2010, August). Retrieved from <http://www.cdc.gov/mrsa/prevent/athletic.html>

CDC - Q&A MRSA in Schools. (2007, October). Questions and Answers about Methicillin-Resistant Staphylococcus aureus (MRSA) in Schools. Retrieved from <http://www.cdc.gov/Features/MRSAinSchools/>

CDC Disinfection Guide, Rutala, W; Weber, D; Healthcare Infection Control Practices Advisory Committee (HICPAC). (2008). Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008. Retrieved from CDC: [http://www.cdc.gov/hicpac/pdf/guidelines/Disinfection\\_Nov\\_2008.pdf](http://www.cdc.gov/hicpac/pdf/guidelines/Disinfection_Nov_2008.pdf)

CDC Environmental Guide. (2003). Guidelines for Environmental Infection Control in Healthcare Facilities, 2003. Retrieved from [http://www.cdc.gov/hicpac/pdf/guidelines/eic\\_in\\_HCF\\_03.pdf](http://www.cdc.gov/hicpac/pdf/guidelines/eic_in_HCF_03.pdf)

CDC Guide - Hand Hygiene, Boyce, J.; Pittet, D. (2002). Guideline for Hand Hygiene in Health-Care Settings: Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. Retrieved from <http://www.cdc.gov/mmwr/PDF/rr/rr5116.pdf>

CDC – Inter-Facility Transfer Form. (2010). Inter-facility Infection Control Transfer Form. Retrieved from <http://www.cdc.gov/HAI/toolkits/InterfacilityTransferCommunicationForm11-2010.pdf>

CDC Isolation Guide, Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L. (2007). Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, 2007. Retrieved from CDC:  
<http://www.cdc.gov/hicpac/pdf/isolation/Isolation2007.pdf>

CDC MDRO Guide - Siegel, J.; Rhinehart, E.; Jackson, M.; Chiarello, L. (2006). Management of Multidrug-Resistant Organisms in Healthcare Settings, 2006. Retrieved from CDC Guide - MDRO in Helthcare Settings:  
<http://www.cdc.gov/ncidod/dhqp/pdf/ar/MDROGuideline2006.pdf>

CDC - VRE. (2010). Vancomycin-resistant enterococci (VRE). Retrieved from:  
[http://www.cdc.gov/ncidod/dhqp/ar\\_VRE\\_publicFAQ.html](http://www.cdc.gov/ncidod/dhqp/ar_VRE_publicFAQ.html)

Chambers, H. (2001). The Changing Epidemiology of Staphylococcus aureus? Retrieved from  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2631711/pdf/11294701.pdf>

CLSI - Clinical and Laboratory Standards Institute. (2010, January). Performance Standards for Antimicrobial Susceptibility Testing; Twentieth Informational Supplement. Retrieved from <http://www.clsi.org/source/orders/free/m100-s20.pdf>

CLSI - Clinical and Laboratory Standards Institute. (2007, January). Performance Standards for Antimicrobial Susceptibility Testing; Seventeenth Informational Supplement, M100-S17, Vol. 27, No. 1. Retrieved from <http://www.microbiolab-bg.com/CLSI.pdf>

CLSI - Cllinical and Laboratory Standards Institute. (2006). Performance Standards for Antimicrobial Susceptibility Testing; Sixteenth Informational Supplement. Wayne, PA.

Colorado Department of Public Health and Environment and MRSA in School/Childcare Settings Working Group. (2003, May). Recommendations for Placement of Children with Methicillin Resistant Staphylococcus aureus (MRSA) in School and Child Care Settings. Retrieved from  
[http://www.cdphe.state.co.us/dc/epidemiology/co\\_mrsa\\_schools5\\_03.pdf](http://www.cdphe.state.co.us/dc/epidemiology/co_mrsa_schools5_03.pdf)

Commonwealth of Massachusetts Department of Public Health. (2008). Questions and Answers about MRSA for School Health Providers. Retrieved from  
[http://www.mass.gov/?pageID=eohhs2terminal&L=6&L0=Home&L1=Provider&L2=Guidelines+and+Resources&L3=Guidelines+for+Services+%26+Planning&L4=School+Health&L5=Antibiotic+Resistance+and+MRSA&sid=Eeohhs2&b=terminalcontent&f=dph\\_cdc\\_p\\_antibiotic\\_mrsa\\_school\\_heal](http://www.mass.gov/?pageID=eohhs2terminal&L=6&L0=Home&L1=Provider&L2=Guidelines+and+Resources&L3=Guidelines+for+Services+%26+Planning&L4=School+Health&L5=Antibiotic+Resistance+and+MRSA&sid=Eeohhs2&b=terminalcontent&f=dph_cdc_p_antibiotic_mrsa_school_heal)

Department of Justice. (2010). Americans with Disabilities Act (ADA) Information Hotline. Retrieved from <http://www.ada.gov/infoline.htm>

Division of Healthcare Quality Promotion. (2004, October). National Nosocomial Infections Surveillance (NNIS) System Report, data summary from January 1992 through June 2004, issued October 2004. Retrieved from CDC.GOV: <http://www.cdc.gov/ncidod/dhqp/pdf/nnis/2004NNISreport.pdf>

Division of Healthcare Quality Promotion. (2007, October 26). VISA/VRSA. Retrieved from CDC.GOV: [http://www.cdc.gov/HAI/organisms/visa\\_vrsa/visa\\_vrsa.html#a1](http://www.cdc.gov/HAI/organisms/visa_vrsa/visa_vrsa.html#a1)

Edwards, J., Peterson, K., Andrus, M., Dudeck, M., Pollock, D., & Horan, T. (2008). National Healthcare Safety Network (NHSN) Report, data summary for 2006 through 2007, issued November 2008. American Journal of Infection Control , 36 (9), 609-626.

Gorwitz, R. (2007, 10 26). Clinician Outreach and Communication Activity; (COCA) Conference Call. Retrieved from <http://www.bt.cdc.gov/coca/>

Hageman, J. (2005, October). Prevention of Methicillin-Resistant Staphylococcus aureus in the Community. CDC Power Point Presentation .

Hageman, J., Patel, J., Carey, R., Tenover, F., & McDonald, L. (2006, September). Investigation and Control of Vancomycin Intermediate and -Resistant Staphylococcus aureus (VISA/VRSA) A Guide for Health Departments and Infection Control Personnel. Retrieved from [http://www.cdc.gov/ncidod/dhqp/pdf/ar/visa\\_vrsa\\_guide.pdf](http://www.cdc.gov/ncidod/dhqp/pdf/ar/visa_vrsa_guide.pdf)

HealthFinder. (2008). Staphylococcal (Staph) Skin Infections. Retrieved from HealthFinder.gov: [http://kidshealth.org/teen/infections/bacterial\\_viral/staph.html](http://kidshealth.org/teen/infections/bacterial_viral/staph.html)

Indiana State Department of Health. (2008). Methicillin-resistant Staphylococcus aureus (MRSA) in Schools. Retrieved from <http://www.in.gov/isdh/files/SchoolMRSA.pdf>

Jarvis, W., Schlosser, J., Chinn, R., Tweeten, S., & Jackson, M. (2007). National prevalence of methicillin-resistant Staphylococcus aureus in inpatients at US health care facilities, 2006. American Journal of Infection Control , 35 (10), 631-637.

Karsting, K., & DHHS, N. (2008, February). Guidelines for School Health Services in Nebraska: Methicillin-Resistant Staphylococcus aureus (MRSA) in Schools, Athletics, and Child Care, February 2008. Retrieved from [http://www.hhs.state.ne.us/SchoolHealth/MANAGEMENT\\_OF\\_MRSA\\_IN\\_SCHOOLS0208.pdf](http://www.hhs.state.ne.us/SchoolHealth/MANAGEMENT_OF_MRSA_IN_SCHOOLS0208.pdf)

Klevens, R., Edwards, J., Tenover, F., McDonald, L., Horan, T., & Gaynes, R. (2006). Changes in the epidemiology of methicillin-resistant Staphylococcus aureus in intensive care units in US hospitals, 1992-2003. *Clinical Infectious Diseases* , 42 (3), 389-391.

Klevens, R., Morrison, M., Nadle, J., Petit, S., Gershman, K., Ray, S., et al. (2007). Invasive methicillin-resistant Staphylococcus aureus infections in the United States. *JAMA* , 298 (15), 1763–1771.

Lefebvre, S., Golab, G., Christensen, E., Castrodale, L., Aureden, K., Bialachowski, A., et al. (2008). Guidelines for animal-assisted interventions in health care facilities. *AJIC: American Journal of Infection Control* , 36 (2), 78-85.

Maryland State Department of Education. (2006). Management of Communicable Diseases in a School Setting. Retrieved from <http://www.marylandpublicschools.org/NR/rdonlyres/6561B955-9B4A-4924-90AE-F95662804D90/3284/CommunicableDiseaseFINAL.pdf>

NCCLS - National Committee for Clinical Laboratory Standards. (1999). Performance standards for antimicrobial susceptibility testing. NCCLS approved standard M100-S9. Wayne, PA.

Nebraska DHHS. (2010). Nebraska MDRO Guidelines 2010. Retrieved from <http://www.dhhs.ne.gov/ars/MDRO-Guidelines-2010.pdf>

Nebraska Statute 79-248. (2010). Nebraska Revised Statute 79-248. Retrieved from NebraskaLegislature.gov: <http://nebraskalegislature.gov/laws/statutes.php?statute=79-248>

Nebraska Statute 79-264. (2010). Nebraska Revised Statute 79-264. Retrieved from NebraskaLegislature.gov: <http://nebraskalegislature.gov/laws/statutes.php?statute=79-264>



Stokowski, L. (2006, November 1). Questions About MRSA and Answers From the Experts. Retrieved from Medscape.com: <http://www.medscape.com/viewarticle/546221>

Tacoma-Pierce County Health Department. (2008). MRSA Toolkit for Athletic Departments. Retrieved from <http://www.tpchd.org/health-wellness-1/diseases-conditions/methicillin-resistant-staphylococcus-aureus-mrsa/mrsa-toolkit-athletic-departments/>

U.S. Department of Justice - National Institute of Corrections. (2001). Correctional Health Care: Guidelines for the Management of an Adequate Delivery System, 2001 Edition. Retrieved from <http://nicic.gov/Library/Files/017521.pdf>

U.S. Environmental Protection Agency. (2009). EPA's Registered Sterilizers, Tuberculocides, and Antimicrobial Products Against Certain Human Public Health Bacteria and Viruses. Retrieved from <http://epa.gov/oppad001/chemregindex.htm>

US Environmental Protection Agency - Office of Pesticide Programs. (2009, January 9). List H: EPA's Registered Products Effective Against Methicillin Resistant Staphylococcus aureus (MRSA) and Vancomycin Resistant Enterococcus faecalis or faecium (VRE). Retrieved from [http://epa.gov/oppad001/list\\_h\\_mrsa\\_vre.pdf](http://epa.gov/oppad001/list_h_mrsa_vre.pdf)

Virginia Department of Health. (2007, October 25). Child Care and MRSA Infections. Retrieved from [http://www.vdh.state.va.us/epidemiology/Surveillance/MRSA/Child\\_Care\\_and\\_MRSA\\_Infections.htm](http://www.vdh.state.va.us/epidemiology/Surveillance/MRSA/Child_Care_and_MRSA_Infections.htm)

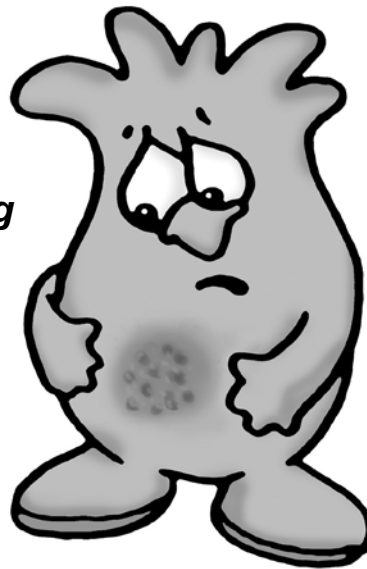
Weber, S., Huang, S., Oriola, S., Huskins, W. C., Noskin, G., Harriman, K., et al. (2007). Legislative mandates for Use of Active Surveillance Cultures to Screen for Methicillin-Resistant Staphylococcus aureus and Vancomycin-Resistant Enterococci: Position Statement From the Joint SHEA and APIC Task Force. Retrieved from [http://www.apic.org/AM/Template.cfm?Section=APIC\\_Position\\_Papers&CONTENTID=9536&TEMPLATE=/CM/ContentDisplay.cfm](http://www.apic.org/AM/Template.cfm?Section=APIC_Position_Papers&CONTENTID=9536&TEMPLATE=/CM/ContentDisplay.cfm)

## References for Updates

This page intentionally left blank for future updates.

# Living with MRSA

*This is really serious.  
I need to do something  
about this now!*



**Learning how to control the spread of  
Methicillin-Resistant Staphylococcus Aureus (MRSA)**

## **IMPORTANT**

**MRSA is a serious infection that can become life-threatening if left untreated. If you or someone in your family has been diagnosed with MRSA, there are steps you need to take now to avoid spreading it to your family and friends.**

**This booklet was developed with help from people who are living with MRSA. Follow the recommendations and practice good hygiene to take care of yourself. MRSA may cause physical pain and emotional stress, but keep in mind that it can be managed. This booklet tells you how you can live with MRSA.**

# CONTENTS

## Learning About MRSA

- Page 91 What is MRSA and why is it so serious?  
91 What does MRSA look like?  
92 How did I get MRSA?  
92 Will I always have MRSA?  
93 How contagious am I?  
93 Is there a test for MRSA?  
94 If I have MRSA, do I need to do anything special when I go to a clinic or hospital?

## Treating MRSA

- 95 How is MRSA treated?  
96 When should I seek medical care?

## Caring for Yourself

- 97 Does it matter how I wash my hands?  
98 Do I need to be careful when I do laundry?  
99 What about cleaning my house?  
100 How do I change my bandages?  
102 Personal Care Guidelines

## Controlling MRSA

- 103 How do I stop MRSA from spreading when I have an active infection?  
104 How do I stop MRSA from spreading when I'm a carrier?  
104 Children and MRSA  
104 Pets and MRSA

## Resources

- 105 Shopping List  
105 Web Sites

## LEARNING ABOUT MRSA

### What is MRSA and why is it so serious?

Some germs that commonly live on the skin and in the nose are called staphylococcus or “staph” bacteria. Usually, staph bacteria don’t cause any harm. However, sometimes they get inside the body through a break in the skin and cause an infection. These infections are usually treated with antibiotics. When common antibiotics don’t kill the staph bacteria, it means the bacteria have become resistant to those antibiotics. This type of staph is called MRSA (Methicillin-Resistant Staphylococcus Aureus).

Anyone can get MRSA. Infections range from mild to very serious, even life-threatening. MRSA is contagious and can be spread to other people through skin-to-skin contact. If one person in a family is infected with MRSA, the rest of the family may get it.

MRSA was first identified in the 1960’s and was mainly found in hospitals and nursing homes. This occurred because antibiotics were being given to people when they weren’t needed, and patients were not taking antibiotics as directed. In the late 1990’s, a new type of MRSA was identified. This type of MRSA is becoming more common among children and adults who do not have medical problems.

### What does MRSA look like?

Most often, MRSA causes infections on the skin. These infections may look like any one of the following:

- Sores that look and feel like spider bites  
(However, MRSA is not caused by a spider bite.)
- Large, red, painful bumps under the skin (called boils)
- A cut that is swollen, hot and filled with pus
- Blisters filled with fluid (called impetigo)

It is also possible to have MRSA in other areas of the body, such as blood, lungs, eyes, and urine. These types of infections are less common, although often more serious. Because skin infections are more common, this booklet will focus on them.

# LEARNING ABOUT MRSA

## How did I get MRSA?

Anyone can get MRSA. You can get MRSA the same way you can get a cold, such as by touching someone or something that has the bacteria on it and then touching your eyes or your nose. Washing your hands often reduces your chances of getting MRSA.

MRSA can live on surfaces and objects for months. However, it can be killed through proper cleaning methods. (Go to the section on “Caring for Yourself” on page 10 to learn more about cleaning.)

Some ways that you could get MRSA:

- Touching the infected skin of someone who has MRSA
- Using personal items of someone who has MRSA, such as towels, wash cloths, clothes or athletic equipment
- Touching objects, such as public phones or doorknobs, that have MRSA bacteria on the surface
- Being in crowded places where germs are easily spread, such as hospitals, nursing homes, daycares or college dorms

You may increase your chances of getting MRSA if:

- You take antibiotics a lot
- You take antibiotics without a prescription
- You don't follow directions when taking antibiotics, such as stopping early or missing doses

You are at greater risk of getting MRSA if you are recovering from surgery or burns, have tubes in your body for medical treatment, or if you share needles.

**There are two ways you can have MRSA.**

**1. You can have an active infection.**

**An active infection means you have symptoms. The types of symptoms depend on where the bacteria are located. Usually an active infection is a skin infection such as a boil, a sore, or an infected cut.**

**2. You can be a carrier.**

**If you are a carrier you do not have symptoms that you can see, but you still have MRSA bacteria living on your skin and in your nose. If you are a carrier, your provider may say that you are colonized. These words – “carrier and “colonized” – mean the same thing.**

## LEARNING ABOUT MRSA

### Will I always have MRSA?

**Maybe.** Many people who have active infections are treated and no longer have MRSA. However, sometimes MRSA goes away after treatment and comes back several times. If MRSA infections keep coming back again and again, your health care provider can help you sort out the reasons you keep getting them.

Even if active infections go away, you can still have MRSA bacteria on your skin and in your nose. This means you are now a carrier of MRSA. You may not get sick or have any more skin infections, but you can spread MRSA to others. It is not fully understood why some people are carriers of MRSA, yet don't get infections.

### How contagious am I?

**If you have an active MRSA infection on your skin, it is contagious.** If someone touches your infections, or touches something that came in contact with your infections (like a towel), that person could get MRSA.

If you are a MRSA carrier, you still have the bacteria on your skin and in your nose. If you don't wash your hands properly, things that you use or touch with your hands can give the bacteria to other people. MRSA can also be found in the liquid that comes out of your nose or mouth when you cough or sneeze.

Remember, if you have MRSA it is possible to spread it to family, friends, other people close to you, and even to pets. Washing your hands and preventing others from coming in contact with your infections are the best ways to avoid spreading MRSA.

### Is there a test for MRSA?

You would not usually be tested for MRSA unless you have an active infection. If you have a skin infection, your health care provider may take a sample of the fluid. This is called taking a culture. The lab will then test the bacteria to find out which antibiotic is best for you.

If your MRSA infections keep coming back again and again, your health care provider may test you or your family members to see if you are carriers. In this case, the provider would take a culture sample from the nose, where MRSA is often found.



## LEARNING ABOUT MRSA

### If I have MRSA, do I need to do anything special when I go to a clinic or hospital?

If you've ever had an active MRSA infection, or you are a carrier, tell all of your health care providers. They will wash their hands and may wear gloves when caring for you. They may also wear a gown to prevent getting the bacteria on their clothes. If you are coughing, they may wear a mask or ask you to wear one. They will always wear gloves when caring for a sore.

If you are staying in a hospital or a nursing home, a "Special Precautions" card may be put on the door of your room. This card alerts staff to use extra care to prevent the spread of MRSA. Your visitors may be instructed to avoid touching infected skin and take other precautions.



### Will I need to wear a mask?

**Your health care provider may wear a mask or ask you to wear one during visits.**

# TREATING MRSA

## How is MRSA treated?

MRSA should always be treated by a health care provider. It is important to follow the instructions for treatment that your provider gives you.

**If you do not have an active infection**, your health care provider may do tests to find out if you still carry MRSA bacteria on your skin. If you are a MRSA carrier, your provider may decide to:

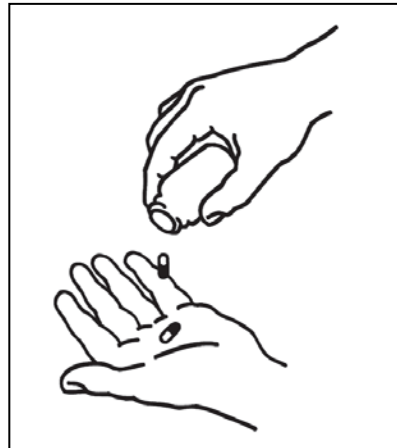
- Do nothing, because the bacteria may go away without treatment
- Reduce the amount of bacteria on your skin

**If you have an active MRSA infection**, your provider may choose one or more of the following treatments:

1. Drain the infection
2. Give antibiotics
3. Reduce the amount of bacteria on your skin

### **1. Drain the infection**

**Don't do this yourself.** It is very dangerous to squeeze or poke a skin infection because it can push the bacteria deeper into the skin and make the infection much worse. Draining the infection should only be done by a trained health care provider.



### **If your provider gives you antibiotics:**

**Take them exactly as prescribed. Do not stop early, even if you feel better. The last few pills kill the toughest germs.**

The provider will open the sore and drain it. After the infection is drained, you must keep it covered until it heals. Sometimes your provider may ask you to come back for a checkup or to change the dressing. This is to make sure it is healing okay. Some skin infections will heal after your health care provider has drained the pus out. You may not need an antibiotic.

## TREATING MRSA

### ***2. Give antibiotics***

MRSA is resistant to many antibiotics so it can be difficult to treat. However, there are antibiotics that can treat MRSA and make the infection go away. Your provider may culture your infection and have the lab test the bacteria to find out which antibiotic is best for you. If your provider gives you antibiotics, take them exactly as prescribed. Do not stop early, even if you feel better. The last few pills kill the toughest germs. Never take antibiotics without a prescription from your health care provider.

### ***3. Reduce the amount of bacteria on your skin or in your nose***

This may prevent the spread of MRSA if you have an active infection or if you are a carrier.

To decrease the amount of bacteria on your skin your provider may, for a short period of time:

- Have you shower daily with antibacterial soap
- Prescribe antibiotic pills
- Prescribe antibiotic ointment to put in your nose for several days

Directions for putting ointment in your nose

1. Put 1/4 inch dab of ointment on a cotton swab (Q-tip)
2. Insert the swab as far into your nose as you can tolerate
3. Gently rub the swab on the inside of your nostril
4. Using a new swab repeat with the other nostril
5. Dispose of the swabs
6. Wash your hands

### **When should I seek medical care?**

- If you have any new symptoms during or after treatment for a MRSA skin infection
- If the infection does not get better
- If the infection gets worse
- If the infection comes back

## CARING FOR YOURSELF

### **Practice good hygiene to reduce the amount of bacteria on your skin.**

Wash your hands often and shower daily. Washing your hands is the number one way to stop the spread of MRSA bacteria.

### **Does it matter how I wash my hands?**

Yes. You have to wash carefully to get rid of the bacteria. Also, you can spread MRSA to people you live with if you share towels. Make sure you have your own hand towel to dry your hands on.

This is the hand washing method recommended by health care providers:

- Wet your hands first under warm running water.
- Apply soap and rub together for at least 15 seconds, getting between the fingers and around nails.
- Rinse with warm running water.
- Dry with a paper towel or hand towel.
- Turn the faucet off using a paper towel or hand towel (remember, your hands were dirty when you turned the faucet on).
- Throw the paper towel in the trash. If you are using a hand towel, do not share it with other people and wash it often.

**Always wash your hands thoroughly:**

- **Before preparing food, eating, or drinking**
- **Before and after touching your eyes, nose, mouth, genitals, sores, acne, boils, or rashes**
- **Before and after changing bandages**
- **Before and after smoking**
- **Before and after blowing your nose**
- **After touching urine, feces, and body fluids—this includes items soiled with body fluids, such as bedding**
- **After cleaning the bathroom, changing your bedding, and doing laundry**
- **After going to the bathroom**
- **After coughing or sneezing**
- **After touching things other people touch, such as phones, door knobs, or shopping carts**

## Caring for yourself

Ask your health care provider about the best kind of soap to use. If soap and water are not available, use an alcohol-based hand sanitizer that you can buy in any drug store. Alcohol-based hand sanitizers will kill the bacteria within 15 seconds after you rub it on your hands. Your hands must be fairly clean for the sanitizer to work. Don't use the hand sanitizers to clean surfaces or objects. Look for a sanitizer with at least 60% alcohol in it.

### Do I need to be careful when I do laundry?

**Yes.** Dirty clothes and bedding can spread MRSA bacteria.

- When collecting your laundry or changing your sheets, hold the dirty laundry away from your body and clothes. This will prevent getting any bacteria on your clothes.
- Wear disposable gloves to handle laundry that is soiled with body fluids, like drainage from a sore, urine or feces. Immediately put the laundry into the washer or into a plastic bag until it can be washed.
- Wash your laundry with warm or hot water. Use bleach if possible.
- Dry in a warm or hot dryer and make sure the clothes are completely dry.
- Wash your hands after handling dirty sheets or clothing and before handling clean laundry, even if you have been wearing gloves.
- Throw gloves away after taking them off. Do not reuse them.



**How often should I change clothes and bedding?**

- **Change your sheets and towels regularly**
- **Change your clothes daily**
- **Do not put dirty clothes or clothes you have just worn back in your closet or drawers until they have been washed**

## CARING FOR YOURSELF

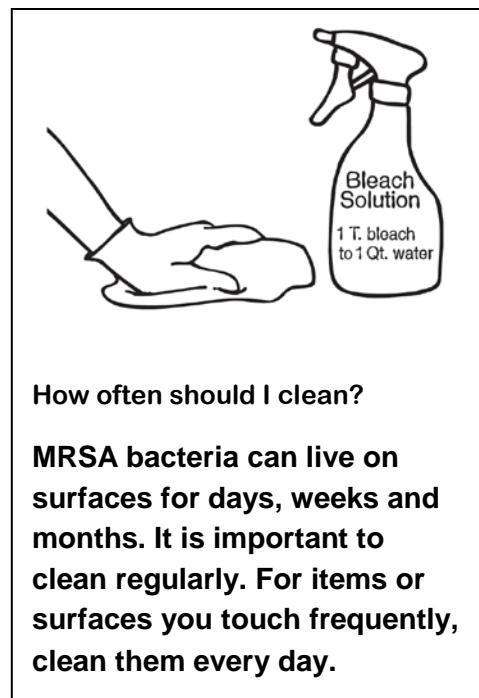
### What about cleaning my house?

Use a disinfectant to regularly clean surfaces. Pay attention to items that are frequently touched — light switches, doorknobs, phones, toilets, sinks, tubs, kitchen counters, cell phones, pagers, and computer keyboards. Wipe the surface or object with the disinfectant and let it dry. If body fluids or pus get onto surfaces, you need to do the following:

1. Put on disposable gloves.
2. Wipe up the fluids with a paper towel.
3. Throw the paper towel in the trash.
4. Clean the surface thoroughly using disinfectant and a paper towel.
5. Throw the paper towel in the trash.
6. Then wipe the surface again with the disinfectant and let it dry for at least 30 seconds.
7. Throw the paper towel in the trash.
8. Remove your gloves and throw them in the trash.
9. Wash your hands or use an alcohol-based hand sanitizer.

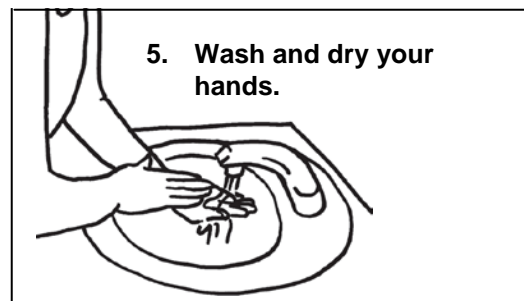
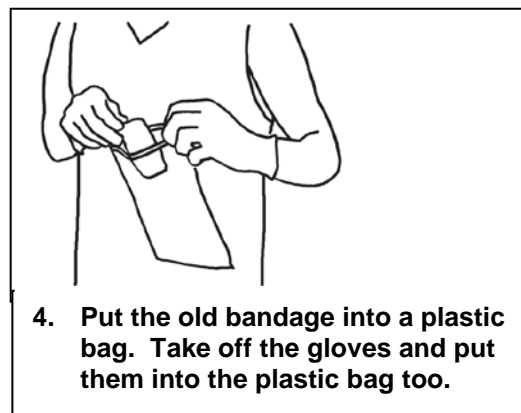
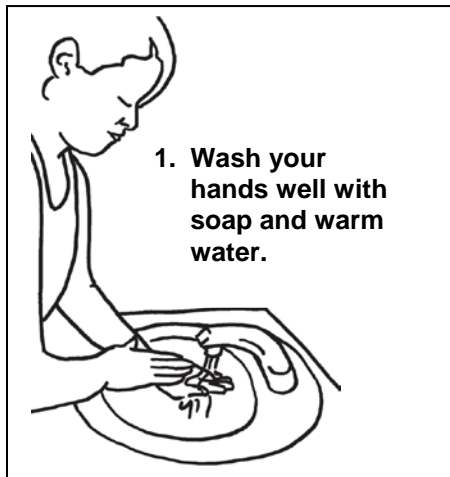
#### **Disinfectants to use**

- Use any cleaner you can buy at the grocery store that has the word “disinfectant” on it. Remember to read the label and follow the directions.
- Make your own solution of bleach and water: Mix one tablespoon bleach into one quart of water in a spray bottle and label it “bleach solution.” Make it fresh each time you plan to clean because the bleach evaporates out of the water making it less effective. Never mix bleach with other cleaners, especially ammonia. Keep the bleach solution away from children and don’t put it in bottles that could be mistaken for something to drink.



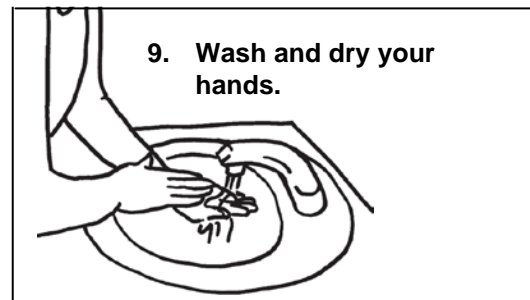
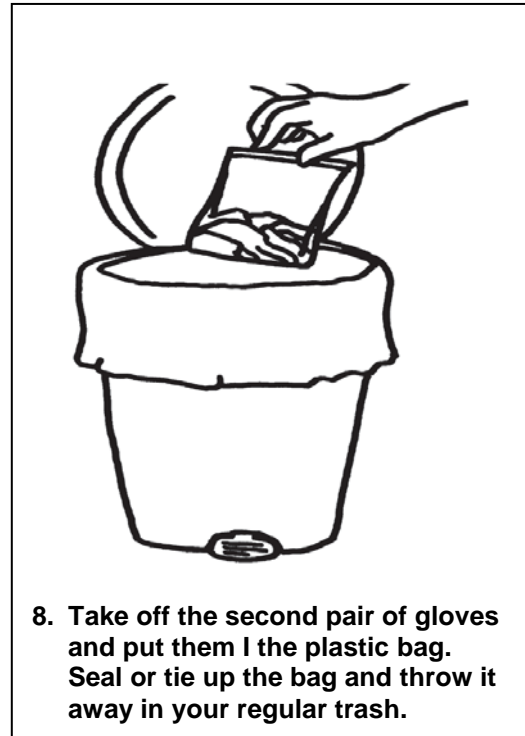
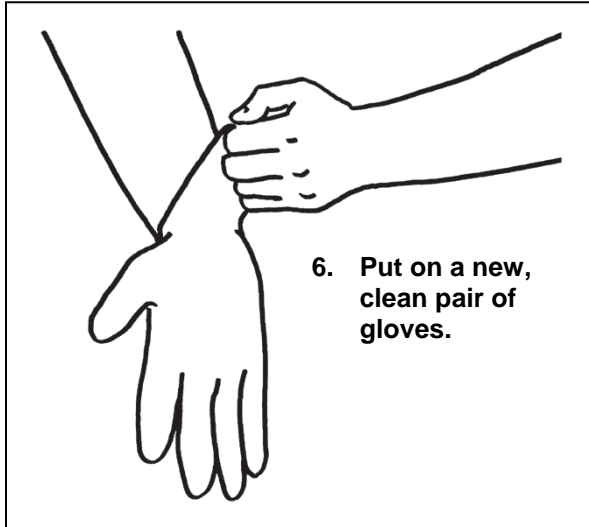
## CARING FOR YOURSELF

### How do I change my bandages?



## CARING FOR YOURSELF

### How do I change my bandages? (continued)





## CARING FOR YOURSELF

### Personal Care Guidelines

- Wash your hands frequently.
- Carry alcohol-based hand gel with you so you can sanitize your hands if soap and water are not available.
- Cover your nose and mouth with a tissue when you cough or sneeze. Throw the tissue in a wastebasket and wash your hands.
- Take a bath or shower every day. This will help reduce the amount of bacteria on your skin.
- Keep your fingernails short to keep the bacteria from growing under and on your nails.
- Change your sheets and towels regularly.
- Change your clothes daily and wash them before wearing again.
- Do not share towels, razors, toothbrushes, or other personal items.
- Take good care of your skin. Remember, MRSA lives on your skin. Any break or crack your skin can allow it to enter and cause an infection. If you get a cut or scrape, clean it with soap and water and then cover it with a bandage.
- Take care of yourself: eat right, exercise, quit smoking, and avoid stress.
- Get medical care at the first sign of infection in a cut, such as redness, swelling, pain, or pus.
- Tell your health care providers that you have had MRSA in the past.
- If you work in a health care setting, you may need to take special precautions. Consult with your employer.



in  
with

## CONTROLLING MRSA

How do I stop MRSA from spreading when I have an active infection?

- Follow the “Personal Care Guidelines” on page 13.
- Do not poke or squeeze the sores.
- Do not touch sores, especially ones that cannot be covered with a bandage or clothing, such as sores on your face. If you do touch a sore, wash your hands immediately.
- Cover any infected sores with a bandage. Follow the steps under “How Do I Change My Bandages?” on page 11. Wash your hands immediately after putting on the bandage.
- If you have a leaking sore, put extra dressings over it to keep the drainage from leaking through. Be careful not to get any pus or body fluids on surfaces or other people.
- Wear clothes that cover your bandages and sores, if possible.
- Be especially careful if you are around people who have weak immune systems, such as newborn babies, the elderly, or anyone with a chronic disease. If they get MRSA, it can make them very ill.
- Be careful if you are around someone who has a skin condition, such as eczema, or someone who just had surgery. They may be more likely to get an infection.
- If MRSA is in your urine or feces, clean your bathroom well.  
If other people handle your urine or feces, they should wear gloves and wash their hands well afterwards.
- Do not participate in contact sports until your sores healed (sweating can cause a bandage to loosen lead to contact with equipment and other people).
- Do not go to a public gym, sauna, hot tub or pool until sores have healed.
- Do not get manicures, massages or hair cuts until sores have healed.



have  
and

## CONTROLLING MRSA

How do I stop MRSA from spreading when I have a carrier?

- Follow the “Personal Care Guidelines” on page 13.
- If you go to a gym, disinfect all equipment after using it. This is standard policy for gyms, and the gym should supply disinfectant.
- Shower well with soap before and after using a public sauna, hot tub or pool.
- Shower immediately after participating in sports or working out at the gym.
- Shower before any intimate skin-to-skin contact with another person. Showering will reduce the amount of bacteria on your skin and reduce the risk of spreading bacteria to the other person.

### Children and MRSA

If you have MRSA and there are children in your life, you can still interact with them. Washing your hands and preventing children from coming in contact with your infections are the best ways to avoid spreading MRSA. Closely follow the “Personal Care Guidelines,” especially when children are present. Make sure children wash their hands, too.

If a child in your family has MRSA, teach the child what it means to have a contagious infection. Your child is likely to be in contact with other children. If your child is in daycare, make a plan with the daycare provider to reduce the risk of spreading MRSA to other children. If your child is in school, make a plan with the school nurse.

### Pets and MRSA

Pets, such as dogs and cats, can also get MRSA. Pets can have active infections or they can be carriers. If you keep getting MRSA infections, or if you see any signs of a skin infection on your pet, talk with your vet about testing your pet. Pets with MRSA can be treated. You do not need to get rid of your pet.

If your pet is diagnosed with MRSA, then the “Personal Care Guidelines” on page 13 apply to your pet as well. Do not touch your pet’s infections and make sure to wear gloves when changing bandages. Consider keeping children separated from the pet until its sores have healed.

## RESOURCES

## Shopping List

These items can be found at most drug stores or grocery stores.

- Disposable gloves
- Tissues
- Alcohol-based hand sanitizer
- Antibacterial soap (if your health care provider recommends it)
- Disinfectant
- Bleach
- Plastic trash bags

## Web Sites

### **Centers for Disease Control and Prevention (CDC)**

[www.cdc.gov/ncidod/dhqp/ar\\_mrsa\\_ca.html](http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca.html)

### **Washington State Department of Health**

[www.doh.wa.gov/topics/antibiotics/MRSA.htm](http://www.doh.wa.gov/topics/antibiotics/MRSA.htm)

**Spanish:** [www.doh.wa.gov/topics/antibiotics/MRSA.htm](http://www.doh.wa.gov/topics/antibiotics/MRSA.htm)

### **Your Local Health Department**

Look in your phone book to find the telephone number,  
or visit: [www.doh.wa.gov/LHJMap/LHJMap.htm](http://www.doh.wa.gov/LHJMap/LHJMap.htm)

## **Acknowledgements**

**Focus group participants**

**Franciscan Health System**

**Group Health Cooperative**

**MultiCare Health System**

**Pierce County Antimicrobial Resistance Task Force**

**Spokane County Health Department**

**Tacoma-Pierce County Health Department**

**Washington State Department of Health,  
Office of Health Promotion**

## Things to remember about living with MRSA:

1. Wash your hands often.
2. Take care of yourself: Eat right, exercise, quit smoking, and avoid stress.
3. Take good care of your skin.
4. Keep skin infections covered to avoid spreading MRSA to others.
5. Talk with your health care provider if you have questions or concerns.

Links for Tacoma Website: <http://www.tpchd.org/search.php?keywords=+mrsa>

Living with MRSA English (booklet):

<http://www.tpchd.org/files/library/2357adf2a147d1aa.pdf>

Living with MRSA English (easy print):

<http://www.tpchd.org/files/library/0da5feee74b2852b.pdf>

Living with MRSA Spanish (booklet):

<http://www.tpchd.org/files/library/02de4ef82888fa9a.pdf>

Viviendo con MRSA – en Espanol:

<http://www.tpchd.org/files/library/02de4ef82888fa9a.pdf>

Antibiotic Resistance Publications for Healthcare Providers:

<http://www.tpchd.org/page.php?id=282>



March 2006

## Appendix 2

### “Living with VRE” (English)

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

VRE stands for Vancomycin-resistant *Enterococcus*. *Enterococcus* is a bacteria that normally lives in the gastrointestinal tract (stomach and bowels), female genital tract (vagina), mouth, throat, and on the skin around the anal area, and may cause infection in other parts of the body. Large amounts of *Enterococcus* are normally found in the feces (stool) of humans. Vancomycin is a very effective antibiotic used to treat *Enterococcal* infections. VRE are bacteria that have developed resistance to vancomycin, and cannot be killed by this antibiotic. Serious infections may be difficult to treat. People can be carriers (colonized) of VRE, which means that they have it in their intestine or on their skin without making them sick, or they can have an active VRE infection, in their urinary tract, wound, lungs or blood that is making them sick.

#### **Who gets VRE?**

If you are healthy, and living in the community, your chances of becoming infected with VRE are low, even if you have been in contact with someone with VRE (for example, at work). You may be more at risk if you have been treated previously with frequent doses of vancomycin. Patients who have trouble fighting infection are also at greater risk of getting sick from VRE.

#### **How are VRE infections treated?**

Healthy people who are carriers (colonized) of VRE do not need treatment. Serious VRE infections, while they are difficult to manage, may still be treated with high doses of vancomycin-like antibiotics. Some new antibiotics may also be effective.

#### **Can VRE spread?**

Yes. The most common way VRE is spread is by contact with an infected person, usually with the hands. A much less common way it can be spread is by contact with environmental surfaces that have been contaminated by the infected person (such as the hand railing, faucets, or handles). Preventing the spread of VRE is very important. The most important thing you can do to prevent the spread of VRE is to wash your hands. Wash the hands before eating, drinking, smoking, or applying personal care products, and after you use the toilet using soap and water or an alcohol based hand rub. Hospitals usually take extra precautions to prevent the spread of VRE, such as putting the patient with VRE in a private room, or in a room with a person who also has VRE.

Also, clean environmental surfaces like hand rails, faucets and handles with disinfectant or freshly prepared chlorine bleach solution made by adding:

- 1 tablespoon of bleach to a quart (4 cups) of water; use a cloth to apply this to surfaces and let stand for 3 – 5 minutes before rinsing with clean water or;
- ¼ cup of bleach to a gallon [16 cups] of water.

Make it fresh each time you plan to clean because the bleach evaporates out of the water making it less effective. Never mix bleach with other cleaners, especially ammonia. Keep the bleach solution away from children and don't put it in bottles that could be mistaken for something to drink.

All health care workers, family and visitors having physical contact with the patient should wear gowns and gloves and complete good hand hygiene when leaving the patient's room. Visiting but not having physical contact with the patient would warrant good hand hygiene when leaving the patient's environment.

### **Once You Are Home**

If you have a wound infected with VRE, keep it covered with clean, dry bandages. If you are prescribed antibiotics, be sure to take all of your medication as directed.

### **Family and Visitors**

Healthy people have very little risk of getting VRE. If you are healthy, then it is okay to be in the same room with a person who has VRE. It is also acceptable for infants and children to have casual contact with these patients. Casual contact, such as kissing, touching and/or hugging is okay, but remember to wash your hands before leaving the patient's home.

Persons who are very ill or have trouble fighting infection should avoid contact with the body fluids (urine, stool, drainage) of the person with VRE, and limit physical contact to no more than casual contact. They should also wash their hands after physical contact with a person who has VRE.

When caring for the VRE patient, disposable gloves should be worn if contact with body fluids is expected. If excessive contact with body fluids is expected, gowns should also be worn.

The following practices are recommended for the care of a person with VRE at home:

- Wash your hands after caring for the person with VRE.
- Clean the hard surface areas of the person's room and bathroom and personal items with a disinfectant or a fresh solution of one tablespoon of bleach in one quart of water.  
Note: Bleach discolors clothing, fabrics, and carpeting. The bleach solution needs to be mixed fresh daily.
- Wear gloves if you touch body substances (blood, urine, wound drainage) and wash your hands after taking off and throwing away the gloves.
- The person with VRE should have their own personal towel and washcloth that no one else uses.
- Use an antibacterial soap or an alcohol based hand rub may help stop the spread of VRE when touching surfaces with your hands.

**If you are going into the hospital, it is very important for you to let the hospital staff know that you have VRE. Also inform your doctors and nurses.**

### **Hand hygiene:**

Hand hygiene is the single most effective step in preventing the spread of germs and infection. Germs, which cause infection, often travel from person to person simply through touching. Anyone who has seen a family member come down with a cold or flu can tell you how easy it is for infections to spread from person to person. Hand hygiene



utilizing soap and water or an alcohol based hand rub helps to remove disease-causing germs before they enter the body or are spread to another person. It is your responsibility to prevent passing germs to family members, visitors, and yourself.

To protect yourself and others, be sure to:

- Wash your hands often – remember, clean hands are key to infection control.
- Wash your hands after removing gloves.
- Wash your hands after touching items that are dirty and may have germs on them.
- Wash your hands after using the rest room, blowing your nose, or covering a sneeze.
- Wash your hands before you eat, drink or prepare or handle food.
- Ask your visitors to wash their hands before and after having contact with you to protect against the spread of germs.
- Wash your hands if you get any blood or other body fluids on them.

Wash your hands after handling soiled or contaminated items such as dressings, clothing, linen, tissues, etc

Appendix 3a  
Hand Washing Poster (English/Spanish)

To print off posters go to: <http://lancaster.unl.edu/food/handwashing.shtml>

# Wash Your Hands!

## ¡Lávese Las Manos!



**1 Wet Hands**  
Mójese las manos



**2 Soap**  
Enjabónese



**3 Wash for 20 seconds**  
Lávese las manos por 20 segundos



**4 Rinse**  
Enjuáguese



**5 Dry**  
Séquese las manos



**6 Turn Off Water with Paper Towel**  
Cierre el grifo usando una toalla de papel

UNIVERSITY OF  
**Nebraska**  
Lincoln EXTENSION

Provided by University of Nebraska-Lincoln Extension in Lancaster County  
and the Lincoln-Lancaster County Health Department

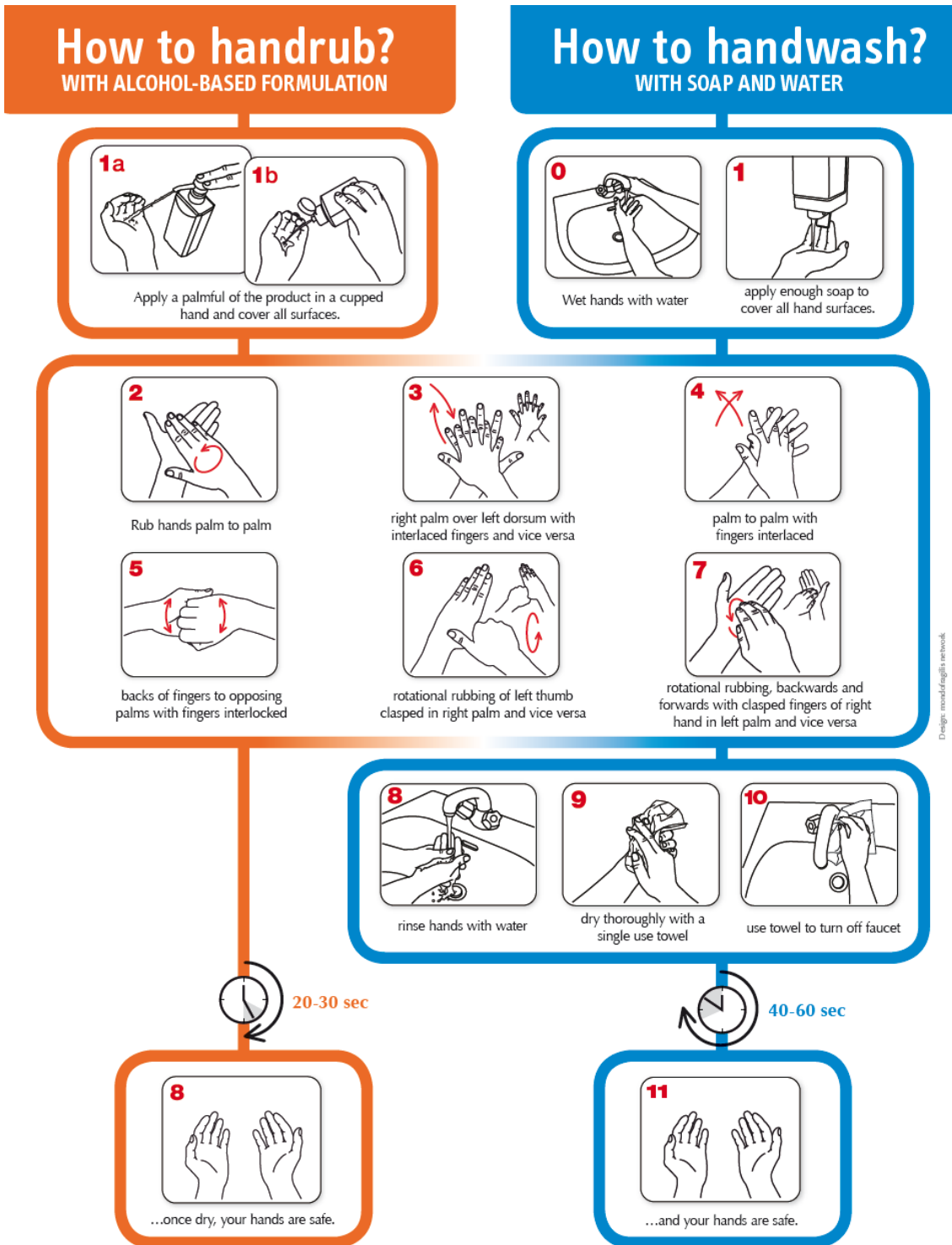


# Appendix 3b

## Handrub / Handwash Poster (English)

To print off posters go to:

<http://www.unon.org/swineflu/docs/Hand%20Hygiene%20WHO%20step%20by%20step.pdf>



Design: model of english network



WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.



October 2006, version 1.

## Appendix 4 Application of Standard Precautions

### Recommendations for Application of Standard Precautions for the Care of all Patients in all Health care Settings.

Component	Recommendations
Hand Hygiene	Between patient/resident contact. After touching blood, body fluids, secretions, excretions, and contaminated items. Prior to putting on gloves and then after removing gloves.
<b>Personal Protective Equipment</b>	
Gloves	For touching blood, body fluids, secretions, excretions, contaminated items, mucous membranes and non-intact skin.
Mask, eye protection, face shield	During procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, and secretions (including aerosolized respiratory secretions).
Gown	During procedures and patient care activities when contact of clothing and exposed skin with blood, body fluids, secretions, or excretions is anticipated.
Soiled patient care equipment	Handle in a manner that prevents transfer of microorganisms to others and the environment; wear gloves if visibly contaminated; perform hand hygiene.
Environmental control	Develop procedures for routine care, cleaning, and disinfection of environmental surfaces, especially frequently touched surfaces in patient-care areas.
Textiles and laundry	Handle in a manner that prevents transfer of microorganisms to others and the environment.
Needles and other sharps	Do not recap, bend, break, or hand-manipulate used needles; if recapping is required, use a one-handed scoop technique only; use safety features when available; place used sharps in puncture-resistant container.
Patient resuscitation	Use mouthpiece, resuscitation bag, or other ventilation devices to prevent contact with mouth and oral secretions.
Patient placement	Prioritize for single-patient room if patient is at increased risk of transmission, is likely to contaminate the environment, does not maintain appropriate hygiene, or is at increased risk of acquiring infection or developing adverse outcome following infection.
Respiratory hygiene/cough etiquette (source containment of infectious respiratory secretions in symptomatic patients, beginning at initial point of encounter)	Instruct person to cover their mouth and nose when sneezing or coughing; use tissues and dispose of in no-touch receptacle; observe hand hygiene after soiling of hands with respiratory secretions; wear surgical mask if tolerated or maintain spatial separation.

(Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, 2007, 2007)pp125-126

## Appendix 5

### Standard – Contact Precautions Table

Component	Standard Precautions	Contact Precautions (Transmission-Based)
	<i>No Known MDRO Infection</i>	<i>Known MDRO Colonization or Infection</i>
Hand Hygiene	After touching blood, body fluids, secretions, excretions, contaminated items; immediately after removing gloves; between patient contacts.	After touching blood, body fluids, secretions, excretions, contaminated items; immediately after removing gloves; between patient contacts.
Personal Protective Equipment (PPE)		
<u>Gloves</u>	For touching blood, body fluids, secretions, excretions, contaminated items, for touching mucous membranes and non-intact skin.	Donning upon entering the room. Discard before exiting room.
<u>Gown</u>	During procedures and patient-care activities when contact of clothing/exposed skin with blood/body fluids, secretions, and excretions is anticipated.	Donning upon entering the room. Discard before exiting room.
<u>Mask, eye protection goggles, face shield</u>	During procedures and patient-care activities likely to generate splashes or sprays of blood, body fluids, and secretions, especially wound irrigation, oral suctioning, and endotracheal intubation.	During procedures and patient-care activities likely to generate splashes or sprays of blood, body fluids, and secretions, especially wound irrigation, oral suctioning, and endotracheal intubation.
Soiled patient-care equipment	Handle in a manner that prevents transfer of microorganisms to others and to the environment; wear gloves if visibly contaminated; perform hand hygiene.	If dedicated equipment is not feasible, clean and disinfect all equipment between patients.

Component	Standard Precautions	Contact Precautions (Transmission-Based)
Environmental control	Develop procedures for routine care, cleaning, and disinfection of environmental surfaces, especially frequently touched surfaces in patient-care areas.	Develop procedures for routine care, cleaning, and disinfection of environmental surfaces, especially frequently touched surfaces in patient-care areas.
Textiles and laundry	Handle in a manner that prevents transfer of microorganisms to others and to the environment.	Handle in a manner that prevents transfer of microorganisms to others and to the environment.
Needles and other sharps	Do not recap, bend, break, or hand-manipulate used needles; if recapping is required, use a one-handed scoop technique only; use safety features when available; place used sharps in puncture-resistant container.	Do not recap, bend, break, or hand-manipulate used needles; if recapping is required, use a one-handed scoop technique only; use safety features when available; place used sharps in puncture-resistant container.
Patient resuscitation	Use mouthpiece, resuscitation bag, or other ventilation devices to prevent contact with mouth and oral secretions.	Use mouthpiece, resuscitation bag, or other ventilation devices to prevent contact with mouth and oral secretions.
Patient placement (In all settings, patients with poor hygiene habits and inability to contain bodily secretions may need a private room)	Prioritize for single-patient room if patient is at increased risk of transmission, is likely to contaminate the environment, does not maintain appropriate hygiene, or is at increased risk of acquiring infection or developing adverse outcome following infection.	Place patient in private room. If private room is unavailable, consider assessing risk factors before cohorting. <i>Do not</i> place MRSA patients with VRE patients.

Component	Standard Precautions	Contact Precautions (Transmission-Based)
Respiratory hygiene/cough etiquette (source containment of infectious respiratory secretions in symptomatic patients, beginning at initial point of encounter such as registration and reception areas)	Instruct symptomatic persons to cover their mouth/nose when sneezing/coughing; use tissues and dispose of in no-touch receptacle; observe hand hygiene after soiling of hands with respiratory secretions; wear surgical mask if tolerated or maintain spatial separation, >3 feet if possible.	Instruct symptomatic persons to cover their mouth/nose when sneezing/coughing; use tissues and dispose of in no-touch receptacle; observe hand hygiene after soiling of hands with respiratory secretions; wear surgical mask if tolerated or maintain spatial separation, >6 feet if possible.
Activity Outside Room	Limit movement and transporting of patients that are likely to contaminate the environment, do not maintain appropriate hygiene, or are at increased risk of acquiring infection or developing adverse outcome following infection.	Limit movement and transporting of patients with MDROs. Patients should only leave their rooms for essential purposes. Body fluids must be contained appropriately while out of the room. Hand hygiene should be done by the patient before leaving the room. Patient may leave room if compliant with basic hygiene.

\* During aerosol-generating procedures on patients with suspected or proven infections transmitted by respiratory aerosols (e.g., SARS), wear a fit-tested N95 or higher respirator in addition to gloves, gown, and face/eye protection (Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, 2007, 2007).

Appendix 6  
Personal Protective Equipment (PPE)

**Figure. Donning and Removing Personal Protective Equipment (PPE)**

**DONNING PPE**

Type of PPE used will vary based on the level of precautions required, e.g., Standard and Contact, Droplet or Airborne Isolation Precautions

**GOWN**

- Fully cover torso from neck to knees, arms to end of wrist, and wrap around the back
- Fasten in back at neck and waist



**MASK OR RESPIRATOR**

- Secure ties or elastic band at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator



**GOGGLES/FACE SHIELD**

- Put over face and eyes and adjust to fit



**GLOVES**

- Extend to cover wrist of isolation gown



**SAFE WORK PRACTICES**

- Keep hands away from face
- Limit surfaces touched
- Change when torn or heavily contaminated
- Perform hand hygiene

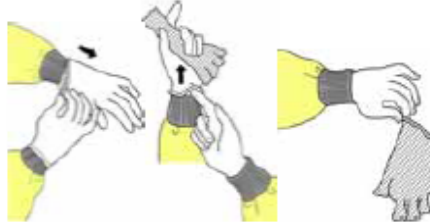


## **REMOVING PPE**

Remove PPE at doorway before leaving patient room or in anteroom; remove respirator outside of room

### **GLOVES**

- Outside of gloves are contaminated!
- Grasp outside of glove with opposite gloved hand; peel off
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist



### **GOGGLES/FACE SHIELD**

- Outside of goggles or face shield are contaminated!
- To remove, handle by "clean" head band or ear pieces
- Place in designated receptacle for reprocessing or in waste container



### **GOWN**

- Gown front and sleeves are contaminated!
- Unfasten neck, the waist ties
- Remove gown using a peeling motion; pull gown from each shoulder toward the same hand
- Gown will turn inside out
- Hold removed gown away from body, roll into a bundle and discard into waste or linen receptacle



### **MASK OR RESPIRATOR**

- Front of mask/respirator is contaminated – DO NOT TOUCH!
- Grasp bottom then top ties/elastics and remove
- Discard in waste container



## **HAND HYGIENE**

Perform immediately after removing all PPE!

Taken from CDC Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Health care Settings 2007

## Appendix 7 Roommate Selection Checklist

### Patient/Resident with MDRO (Multi Drug Resistant Organisms) (when a private room is not available)

☆ This is only a sample of criteria one might consider when exploring feasibility of roommates. Criteria are facility-specific based on risk assessments of population served.

Questions to ask: If the answer is “yes” to **any** of the following, placement of MDRO person with candidate **is not** indicated.

- | Yes                      | No                       |   |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Roommate has clinical diagnosis or condition(s) that denotes increased risk for MDRO infection or colonization (e.g., immunosuppression)  |
| <input type="checkbox"/> | <input type="checkbox"/> | Both candidates have same MDRO (e.g., MRSA), but have different antibiograms (antibiotic sensitivity of microorganism on culture results) |
| <input type="checkbox"/> | <input type="checkbox"/> | Candidates have different MDROs (e.g., one has MRSA and other has VRE)  |
| <input type="checkbox"/> | <input type="checkbox"/> | Candidate(s) with MDRO is currently being treated for MDRO infection  |
| <input type="checkbox"/> | <input type="checkbox"/> | Either candidate has non-intact skin, open wounds, stasis ulcers, decubiti, burns, etc.   |
| <input type="checkbox"/> | <input type="checkbox"/> | Either candidate has non-contained drainage   |
| <input type="checkbox"/> | <input type="checkbox"/> | Either candidate has indwelling devices (e.g., IV, Foley catheter, G-tube, wound suction dialysis catheter)<br>or                         |
| <input type="checkbox"/> | <input type="checkbox"/> | Either candidate has fecal or bladder incontinence (e.g., body wastes not fully contained in stoma, catheter bag, or incontinence diaper) |
| <input type="checkbox"/> | <input type="checkbox"/> | Either candidate is unwilling or unable to cooperate in strategies to contain his/her body secretions or perform preventative measures    |

Edited original format published in Hospital Infection Control/September1999: “Infection control methods used to stall VRE spread.”

# Appendix 8

## Behavioral Health Checklist

### Management of Patients with Multiple Drug Resistant Organisms (MDROs)

#### Behavioral Health

#### MDROs Precaution Checklist

#### Questions to ask about MDRO (MRSA or VRE) Patient:

If the answer is “yes” to any of the following the patient will need to be placed in a private room and **Contact Precautions** are indicated. If there is a shared bathroom between two rooms, then only the patient in **Contact Precautions** can utilize the shared bathroom and patients in adjoining room need to utilize the community bathroom.

<u>Yes</u>	<u>No</u>	
<input type="checkbox"/>	<input type="checkbox"/>	Does the patient have non-intact skin, open wounds, stasis ulcers, decubiti, burns, or indwelling devices (i.e. IV, Foley Catheter, G-tube, wound suction or dialysis catheter)?
<input type="checkbox"/>	<input type="checkbox"/>	Does the patient have a long term fecal or bladder incontinence (i.e., body wastes not fully contained in stoma, catheter bag or incontinence diaper)?
<input type="checkbox"/>	<input type="checkbox"/>	Does the patient have other drainage that is not contained?
<input type="checkbox"/>	<input type="checkbox"/>	Is the patient unwilling or unable to cooperate in strategies to contain his/her body secretions?
<input type="checkbox"/>	<input type="checkbox"/>	Is the patient cognitively impaired in ways that may allow MDRO transmission?

Adapted from Alegent Health\_2006

# Appendix 9

## CDC Tier 1 Approach

### Tier 1. General Recommendations for Routine Prevention and Control of MDROs in Health care Settings

Administrative Measures/Adherence Monitoring	MDRO Education	Judicious Antimicrobial Use	Surveillance	Infection Control Precautions to Prevent Transmission	Environmental Measures	Decolonization
<p>Make MDRO prevention/control an organizational priority. Provide administrative support and both fiscal and human resources to prevent and control MDRO transmission. (IB)</p> <p>Identify experts who can provide consultation and expertise for analyzing epidemiologic data, recognizing MDRO problems, or devising effective control strategies, as needed. (II)</p> <p>Implement systems to communicate information about reportable MDROs to administrative personnel and state/local health departments. (II)</p> <p>Implement a multi-disciplinary process to monitor and improve HCP adherence to recommended practices for Standard and Contact Precautions. (IB)</p> <p>Implement systems to designate patients known to be colonized or infected with a targeted MDRO and to notify receiving health care facilities or personnel prior to transfer of such patients within or between facilities. (IB)</p> <p>Support participation in local, regional and/or national coalitions to combat emerging or growing MDRO problems. (IB)</p> <p>Provide updated feedback at least annually to health care providers and administrators on facility and patient-care unit MDRO infections. Include information on changes in prevalence and incidence, problem assessment and performance improvement plans. (IB)</p>	<p>Provide education and training on risks and prevention of MDRO transmission during orientation and periodic educational updates for HCP; include information on organizational experience with MDROs and prevention strategies. (IB)</p>	<p>In hospitals and LTCFs, ensure that a multi-disciplinary process is in place to review local susceptibility patterns (antibiograms), and antimicrobial agents included in the formulary, to foster appropriate antimicrobial use. (IB)</p> <p>Implement systems (e.g., CPOE, susceptibility report comment, pharmacy or unit director notification) to prompt clinicians to use the appropriate agent and regimen for the given clinical situation. (IB)</p> <p>Provide clinicians with antimicrobial susceptibility reports and analysis of current trends, updated at least annually, to guide antimicrobial prescribing practices. (IB)</p> <p>In settings with limited electronic communication system infrastructures to implement physician prompts, etc., at a minimum implement a process to review antibiotic use. Prepare and distribute reports to providers. (II)</p>	<p>Use standardized laboratory methods and follow published guidelines for determining antimicrobial susceptibilities of targeted and emerging MDROs.</p> <p>Establish systems to ensure that clinical micro labs (in-house and outsourced) promptly notify infection control or a medical director/designee when a novel resistance pattern for that facility is detected. (IB)</p> <p>In hospitals and LTCFs:          ...develop and implement laboratory protocols for storing isolates of selected MDROs for molecular typing when needed to confirm transmission or delineate epidemiology of MDRO in facility. (IB)          ...establish laboratory-based systems to detect and communicate evidence of MDROs in clinical isolates (IB)          ...prepare facility-specific antimicrobial susceptibility reports as recommended by CLSI; monitor reports for evidence of changing resistance that may indicate emergence or transmission of MDROs (IA/IC)          ...develop and monitor special-care unit-specific antimicrobial susceptibility reports (e.g., ventilator-dependent units, ICUs, oncology units). (IB)          ...monitor trends in incidence of target MDROs in the facility over time to determine if MDRO rates are decreasing or if additional interventions are needed. (IA)</p>	<p>Follow Standard Precautions in all health care settings. (IB)</p> <p>Use of Contact Precautions (CP):          --- In acute care settings : Implement CP for all patients known to be colonized/infected with target MDROs. (IB)          --- In LTCFs: Consider the individual patient's clinical situation and facility resources in deciding whether to implement CP (II)          --- In ambulatory and home care settings, follow Standard Precautions (II)          ---In hemodialysis units: Follow dialysis specific guidelines (IC)</p> <p>No recommendation can be made regarding when to discontinue CP. (Unresolved issue)</p> <p>Masks are not recommended for routine use to prevent transmission of MDROs from patients to HCWs. Use masks according to Standard Precautions when performing splash-generating procedures, caring for patients with open tracheostomies with potential for projectile secretions, and when there is evidence for transmission from heavily colonized sources (e.g., burn wounds).</p> <p>Patient placement in hospitals and LTCFs:          When single-patient rooms are available, assign priority for these rooms to patients with known or suspected MDRO colonization or infection. Give highest priority to those patients who have conditions that may facilitate transmission, e.g., uncontained secretions or excretions. When single-patient rooms are not available, cohort patients with the same MDRO in the same room or patient-care area. (IB)</p> <p>When cohorting patients with the same MDRO is not possible, place MDRO patients in rooms with patients who are at low risk for acquisition of MDROs and associated adverse outcomes from infection and are likely to have short lengths of stay. (II)</p>	<p>Follow recommended cleaning, disinfection and sterilization guidelines for maintaining patient care areas and equipment.          Dedicate non-critical medical items to use on individual patients known to be infected or colonized with an MDRO. Prioritize room cleaning of patients on Contact Precautions. Focus on cleaning and disinfecting frequently touched surfaces (e.g., bed rails, bedside commodes, bathroom fixtures in patient room, doorknobs) and equipment in immediate vicinity of patient.</p>	<p>Not recommended routinely</p>

# Appendix 10

## CDC Tier 2 Approach

### Tier 2. Recommendations for Intensified MDRO control efforts

Institute one or more of the interventions described below when 1) incidence or prevalence of MDROs are not decreasing despite the use of routine control measures; or 2) the first case or outbreak of an epidemiologically important MDRO (e.g., VRE, MRSA, VISA, VRSA, MDR-GNB) is identified within a health care facility or unit (IB) Continue to monitor the incidence of target MDRO infection and colonization; if rates do not decrease, implement additional interventions as needed to reduce MDRO transmission.

Administrative Measures/Adherence Monitoring	MDRO Education	Judicious Antimicrobial Use	Surveillance	Infection Control Precautions to Prevent Transmission	Environmental Measures	Decolonization
<p>Obtain expert consultation from persons with experience in infection control and the epidemiology of MDROs, either in-house or through outside consultation, for assessment of the local MDRO problem and guidance in the design, implementation and evaluation of appropriate control measures. (IB) Provide necessary leadership, funding and day-to-day oversight to implement interventions selected. (IB) Evaluate health care system factors for role in creating or perpetuating MDRO transmission, including staffing levels, education and training, availability of consumable and durable resources; communication processes, and adherence to infection control measures. (IB) Update health care providers and administrators on the progress and effectiveness of the intensified interventions. (IB)</p>	<p>Intensify the frequency of educational programs for health care personnel, especially for those who work in areas where MDRO rates are not decreasing. Provide individual or unit-specific feedback when available. (IB)</p>	<p>Review the role of antimicrobial use in perpetuating the MDRO problem targeted for intensified intervention. Control and improve antimicrobial use as indicated. Antimicrobial agents that may be targeted include vancomycin, third-generation cephalosporins, antianaerobic agents for VRE; third generation cephalosporins for ESBLs; and quinolones and carbapenems. (IB)</p>	<p>Calculate and analyze incidence rates of target MDROs (single isolates/patient; location-, service-specific) (IB) Increase frequency of compiling, monitoring antimicrobial susceptibility summary reports (II)</p> <p>Implement laboratory protocols for storing isolates of selected MDROs for molecular typing; perform typing if needed (IB)</p> <p>Develop and implement protocols to obtain active surveillance cultures from patients in populations at risk. (IB) (See recommendations for appropriate body sites and culturing methods.)</p> <p>Conduct culture surveys to assess efficacy of intensified MDRO control interventions.</p> <p>Conduct serial (e.g., weekly) unit-specific point prevalence culture surveys of the target MDRO to determine if transmission has decreased or ceased. (IB)</p> <p>Repeat point-prevalence culture-surveys at routine intervals and at time of patient discharge or transfer until transmission has ceased. (IB)</p> <p>If indicated by assessment of the MDRO problem, collect cultures to assess the colonization status of roommates and other patients with substantial exposure to patients with known MDRO infection or colonization. (IB)</p> <p>Obtain cultures from HCP for target MDROs when there is epidemiologic evidence implicating the staff member as a source of ongoing transmission. (IB)</p>	<p>Use of Contact Precautions: Implement Contact Precautions (CP) routinely for all patients colonized or infected with a target MDRO. (IA) Don gowns and gloves before or upon entry to the patient's room or cubicle. (IB) In LTCFs, modify CP to allow MDROcolonized/infected patients whose site of colonization or infection can be appropriately contained and who can observe good hand hygiene practices to enter common areas and participate in group activities When active surveillance cultures are obtained as part of an intensified MDRO control program, implement CP until the surveillance culture is reported negative for the target MDRO (IB) No recommendation is made for universal use of gloves and/or gowns. (Unresolved issue) Implement policies for patient admission and placement as needed to prevent transmission of the problem MDRO. (IB) When single-patient rooms are available, assign priority for these rooms to patients with known or suspected MDRO colonization or infection. Give highest priority to those patients who have conditions that may facilitate transmission, e.g., uncontained secretions or excretions. When single-patient rooms are not available, cohort patients with the same MDRO in the same room or patient-care area. (IB) When cohorting patients with the same MDRO is not possible, place MDRO patients in rooms with patients who are at low risk for acquisition of MDROs and associated adverse outcomes from infection and are likely to have short lengths of stay. (II) Stop new admissions to the unit or facility if transmission continues despite the implementation of the intensified control measures. (IB)</p>	<p>Implement patient-dedicated use of non-critical equipment (IB) Intensify and reinforce training of environmental staff who work in areas targeted for intensified MDRO control. Some facilities may choose to assign dedicated staff to targeted patient care areas to enhance consistency of proper environmental cleaning and disinfection services (IB) Monitor cleaning performance to ensure consistent cleaning and disinfection of surfaces in close proximity to the patient and those likely to be touched by the patient and HCWs (e.g., bedrails, carts, bedside commodes, doorknobs, faucet handles) (IB). Obtain environmental cultures (e.g., surfaces, shared equipment) only when epidemiologically implicated in transmission (IB) Vacate units for environmental assessment and intensive cleaning when previous efforts to control environmental transmission have failed (II)</p>	<p>Consult with experts on a case-by-case basis regarding the appropriate use of decolonization therapy for patients or staff during limited period of time as a component of an intensified MRSA control program (II)</p> <p>When decolonization for MRSA is used, perform susceptibility testing for the decolonizing agent against the target organism or the MDRO strain epidemiologically implicated in transmission. Monitor susceptibility to detect emergence of resistance to the decolonizing agent. Consult with microbiologists for appropriate testing for mupirocin resistance, since standards have not been established.</p> <p>Do not use topical mupirocin routinely for MRSA decolonization of patients as a component of MRSA control programs in any health care setting. (IB)</p> <p>Limit decolonization to HCP found to be colonized with MRSA who have been epidemiologically implicated in ongoing transmission of MRSA to patients. (IB)</p> <p>No recommendation can be made for decolonization of patients who carry VRE or MDR-GNB.</p>

# Appendix 11

## Inter-facility Infection Control Transfer Form

This form must be filled out for transfer to accepting facility with information communicated prior to or with transfer  
*Please attach copies of latest culture reports with susceptibilities if available*

**Sending Healthcare Facility:**

Patient/Resident Last Name	First Name	Date of Birth	Medical Record Number
		__/__/____	

Name/Address of Sending Facility	Sending Unit	Sending Facility phone

Sending Facility Contacts	NAME	PHONE	E-mail
Case Manager/Admin/SW			
Infection Prevention			

**Is the patient currently in isolation?**     NO     YES  
**Type of Isolation (check all that apply)**     Contact     Droplet     Airborne     Other: \_\_\_\_\_

Does patient currently have an infection, colonization OR a history of positive culture of a multidrug-resistant organism (MDRO) or other organism of epidemiological significance?	Colonization or history <i>Check if YES</i>	Active infection on Treatment <i>Check if YES</i>
Methicillin-resistant Staphylococcus aureus (MRSA)		
Vancomycin-resistant Enterococcus (VRE)		
Clostridium difficile		
Acinetobacter, multidrug-resistant*		
E coli, Klebsiella, Proteus etc. w/Extended Spectrum B-Lactamase (ESBL)*		
Carbapenemase resistant Enterobacteriaceae (CRE)*		
Other:		

**Does the patient/resident currently have any of the following?**

- |   |  |
|---|--|
| <input type="checkbox"/> Cough or requires suctioning<br><input type="checkbox"/> Diarrhea<br><input type="checkbox"/> Vomiting<br><input type="checkbox"/> Incontinent of urine or stool<br><input type="checkbox"/> Open wounds or wounds requiring dressing change<br><input type="checkbox"/> Drainage (source) _____ | <input type="checkbox"/> Central line/PICC (Approx. date inserted __/__/____)<br><input type="checkbox"/> Hemodialysis catheter<br><input type="checkbox"/> Urinary catheter (Approx. date inserted __/__/____)<br><input type="checkbox"/> Suprapubic catheter<br><input type="checkbox"/> Percutaneous gastrostomy tube<br><input type="checkbox"/> Tracheostomy |
|---|--|

**Is the patient/resident currently on antibiotics?**     NO     YES:

Antibiotic and dose	Treatment for:	Start date	Anticipated stop date

Vaccine	Date administered (If known)	Lot and Brand (If known)	Year administered (If exact date not known)	Does Patient self report receiving vaccine?	
Influenza (seasonal)				<input type="radio"/> yes	<input type="radio"/> no
Pneumococcal				<input type="radio"/> yes	<input type="radio"/> no
Other: _____				<input type="radio"/> yes	<input type="radio"/> no

Printed Name of Person completing form	Signature	Date	If information communicated prior to transfer: Name and phone of individual at receiving facility