

State of Maine Recommendations for the Prevention and Control of Infectious Conditions in Long Term Care Facilities

Chapter One: Methicillin Resistant Staphylococcal Aureus (MRSA) Vancomycin Resistant Enterococcus (VRE)

Introduction and Background

Multi-Drug Resistant Organisms (MDRO) have been on a significant rise over the last decade and are considered a risk for the health and safety of the Long Term Care (LTC) resident. For the purpose of this chapter, focus will be placed on MRSA (Methicillin Resistant Staphylococcus Aureus) and VRE (Vancomycin Resistant Enterococcus). MRSA was first isolated in the United States in 1968 and VRE in the 1980's. Since that time, MRSA has increased to the point in which it now accounts for approximately 50-70% of all Staphylococcus aureus isolates.(1)

Both VRE and MRSA are a growing problem in healthcare including LTC facilities. The Bradley S.F. study reported colonization rates in LTC facilities ranged from 8% to 83% depending on the site colonized and the facility.(5) MRSA infected and colonized residents serve as sources of spread and transmission in LTC facilities. Elderly and disabled residents are at risk for colonization with MRSA and colonized residents tend to carry MRSA for long periods of time.(2) Although the exact burden of MDRO colonization in LTC Facilities is not known, residents colonized with MRSA are almost four times more likely to develop infection than those colonized with Methicillin Sensitive Staphylococcus Aureus (MSSA).(3)

This guideline is meant to aid LTC Facilities, including nursing homes, extended care facilities and assisted housing providers in limiting the spread of MDRO. This document will address the following components:

- Terminology
- Understanding of MRSA and VRE
- Common risk factors for acquiring a MDRO
- Infection prevention and control measures
- References
- Resources
- Appendices (i.e. CDC HICPAC Recommendations for Isolation Precautions, Tracking tool for MDRO residents)

Terminology

Cohort: To place two or more residents colonized or infected with the same pathogen in the same living quarters.

Cohort staffing: The practice of assigning staff to work with previously designated groups. One staff only cares for MDRO residents while another staff person only cares for non-MDRO residents.

Contact Precautions: A set of practices used to prevent the transmission of infectious agents that are spread by direct or indirect contact with the resident or the resident's environment.(4) Practice includes resident placement, barriers (may include gowns, gloves, mask and eye protection) and hand hygiene.

Colonized: The condition in which a resident carries a MDRO in or on their body (skin, nose, wound, rectum, etc.), exhibits no signs or symptoms of active infection, but is able to transmit the bacteria carried on their body to others.

Decolonization: Antibiotic treatment to try to eliminate the MRDO colonization from the resident. This practice is not recommended or encouraged except in outbreak situations and only under the direction of the Maine CDC (1-800-521-5821).

Infection: The condition in which the resident is infected with a pathogen and it is causing signs and symptoms of infection i.e. redness, wound drainage, fever, swelling, burning with urination, etc.

Line listing: A type off epidemiologic database, organized similar to a spreadsheet with rows and columns in which information from cases or residents are listed; each column represents a variable, and each row represents an individual case or resident

Outbreak or cluster: An increase in the normal incidence of a MDRO in a facility.

Pathogen: A microbe able to cause infection in an individual.

Standard Precautions: A group of infection prevention practices that apply to all residents, regardless of suspected or confirmed diagnosis or presumed infection status. Standard precautions 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 (i.e. MRSA, VRE, C-Diff, HIV, Hepatitis B, etc). Standard Precautions include hand hygiene, and depending on the anticipated exposure, use of gloves, gown, mask, eye protection, or face shield.(4) Standard Precautions also focus on appropriate environmental cleaning, cleaning of shared patient equipment and exposure prevention.

Healthcare worker: Any individual who works within the confines of a healthcare facility, i.e. maintenance, housekeeping dietary, nurse, provider, student, volunteer, etc.

Understanding MRSA and VRE

MRSA is a Staphylococcus aureus (SA) bacteria that is resistant to the antibiotic Methicillin. Methicillin, or Oxacillin as it is also called, are antibiotics in the Penicillin family. Antibiotics in the Penicillin family are usually the antibiotics chosen to treat an infection caused by SA. When SA becomes resistant to Methicillin, MRSA, it becomes very difficult for providers to treat due to the limited choice of antibiotics. Any untreated staphylococcal infections, including MRSA, can become life threatening if allowed to progress and infect the blood, heart, lungs or other organs.

VRE is an Enterococcus bacteria resistant to the strongest antibiotic used to treat infection, Vancomycin. Both MRSA and VRE can cause infection and or colonization in the resident. When the resident has an infection, the resident should have at least one if not a combination of signs and symptoms, depending on where the infection is (i.e. fever, draining wound, productive cough, urinary symptoms). Infections are confirmed by a positive clinical culture and require treatment.

When the resident is colonized (with either bacteria), the resident is without signs of infection as mentioned above. Residents colonized with MRSA are usually colonized in the nares, skin or an ulcerative area. Residents colonized with VRE are colonized on the perineum or in the GI tract. Residents whether colonized or infected are the primary reservoirs of MRSA in LTC facilities. (5) Colonized residents do not require treatment and even if treated will most likely regain colonization over a short period of time.

Transmission of MDRO is most commonly caused by contaminated hands and clothing of healthcare workers who have come in contact with residents who are infected or colonized. Healthcare workers pick up bacteria on their hands and clothing when they come in contact with the resident or the resident's environment. Depending on the bacterial load the resident carries the healthcare worker may become contaminated with small to large amounts of bacteria. (5) The healthcare worker may also be at risk for developing infection themselves or for transmitting the bacteria to family members or other residents either on their hands or clothing. (5)

Common Risk Factors for Acquiring MRSA and VRE

- Multiple hospital admissions
- Over 65 years of age
- Indwelling devices (i.e. Foley catheters, dialysis catheters, gastrostomy tubes)
- Prolonged hospital stay
- Slow healing wound (i.e. surgical, decubitus)
- Living in a facility with a MRSA and VRE roommate
- Previous broad spectrum antimicrobial therapy
- Hospital stay in an Intensive Care Unit

The situations listed above are some of the risk areas for acquiring MRSA and VRE within the healthcare system. MRSA at this time can also be acquired in some community settings which will not be discussed in this document.

Precautions

Standard Precautions

Standard Precautions are defined by the Centers for Disease Control (CDC) as a group of infection prevention practices that apply to **all** residents, regardless of suspected or confirmed diagnosis or presumed infection status. Standard Precautions are a combination and expansion of Universal Precautions and Body Substance Isolation and 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 the following; hand hygiene, and depending on the anticipated exposure, use of gloves, gown, mask, eye protection or face shield; cleaning of shared patient equipment, environmental surfaces, textiles and laundry; use of protective devices on needles and other sharps; resident resuscitation, resident placement and respiratory hygiene/cough etiquette.(6) Standard Precautions consist of the following:

1. **Hand Hygiene** - performed prior to and after every resident contact. Hand hygiene consists of routine hand washing or application of alcohol gel. Routine hand washing is performed by wetting hands with warm water, applying soap, rubbing hands together causing friction, coating all surfaces of the hands for a minimum of 15 seconds, rinsing hands with running water and concluding by wiping hands with paper towel and shutting off the faucets with the paper towels. Hand washing should be performed instead of applying alcohol gel when hands are visibly soiled. Application of alcohol gel is done by applying alcohol gel (containing at least 60% alcohol) to the palm of one hand and applying gel to all surfaces of hands, rubbing together, causing friction lasting at least 20 seconds until hands are dry.
2. **Gloves** - worn by the healthcare worker any time the healthcare worker will be in contact with the resident or items in the resident's environment that may be contaminated with blood, body fluids, secretions, excretions (except sweat), mucous membranes and non-intact skin. Hand hygiene must always be performed when removing gloves and should be encouraged prior to gloving to maintain the integrity of the glove boxes which can be contaminated easily if accessing with unclean hands.
3. **Gowns** - worn by the healthcare worker during procedures and patient care activities when there may be anticipated contact of the healthcare worker's clothing or exposed skin with blood, body fluids, secretions, excretions (except sweat), mucous membranes and non-intact skin. (i.e. complete bed baths, complete bed changes, changing incontinent residents, etc.)

4. **Masks with eye protection and/or face shield** - worn during procedures and patient care activities that are likely to generate splashes or sprays of blood, body fluids, secretions, excretions (except sweat). (i.e. when performing tracheotomy care and the resident is coughing or vomiting)
5. **Resident care equipment** - handled in a manner that prevents transfer of microorganisms to other residents and to the environment. All shared resident equipment must be cleaned between each resident use. (i.e. clean blood pressure cuffs, pulse oximeters and stethoscopes with disinfecting wipes before using on the next resident). A facility may have different options for equipment including the following:
 - a resident may have disposable equipment
 - a resident may have designated equipment that is well cleaned or disposed of after the resident leaves the facility
 - The facility has portable equipment on a cart accompanied by alcohol wipes with the equipment to ensure that it is cleaned between residents
6. **Environmental surfaces** - cleaned and disinfected on a routine basis with extra attention to frequently touched surfaces. (i.e. doorknobs, over the bed tables, bathrooms, etc.). Facilities may review their disinfectant solutions to determine if they are effective against MRSA and VRE and should use disinfectants approved by the Environmental Protection Agency and Food and Drug Agency (EPA/FDA). In the absence of a commercial cleaner a facility may make up a bleach solution of 1:10. This solution remains effective if it is made up daily.
7. **Textiles and laundry** - handled in a manner that prevents spread/transfer of microorganisms to the environment and others. (i.e. when removing soiled/used linen from the residents bed, do not shake linen, or hold linen against healthcare workers clothing.)
8. **Needles and other sharps** - utilize sharps protective devices to prevent puncture transmission of infection per facility policy.
9. **Resident resuscitation** - performed with a mouth piece with a one-way valve, resuscitation bag or other ventilation device.
10. **Resident placement** - consider the following issues of placement in attempting to minimize infection transmission;
 - a. Resident is likely to contaminate the environment (i.e. unable to or refuses to control secretions).
 - b. Resident does not maintain appropriate hygiene.
 - c. Resident is at increased risk of acquiring an infection (i.e. resident has indwelling devices such as a Foley catheter or gastrostomy tube.)
 - d. Resident is at increased risk of developing an adverse outcome following an infection due to a fragile health state.

11. **Respiratory hygiene /cough etiquette** – Instruct all staff and residents
 - a. Cover nose and mouth when sneezing or coughing
 - b. Use of tissues and proper disposal in the trash
 - c. Hand hygiene after contact with respiratory secretions

Contact Precautions

Contact Precautions are used in addition to Standard Precautions and are intended to prevent transmission of identified infectious agents, including epidemiologically important microorganisms, which are spread by direct or indirect contact with the resident or the resident's environment.(6) Contact Precautions consist of the following:

1. **Hand hygiene** - as listed under standard precautions.
2. **Gloves and gowns** - donned prior to all interactions with the resident within the resident's environment/room or with the resident's potentially contaminated environment.
3. **Masks, eye protection and/or face shield** - as listed under standard precautions. If the resident's sputum contains MRSA and the resident can not contain secretions or is unable to cover mouth and nose when coughing or sneezing the healthcare worker should wear a mask and eye protection when working within three feet of the resident.

Residents infected with MRSA in their sputum (not nares) and are unable to control their cough, need to wear a mask upon leaving their room.

4. **Resident care equipment** - Clean (stethoscope, thermometer, etc.) between each use or dedicate equipment to each resident on Contact Precautions.
5. **Textiles and laundry** - Bag in the resident's room prior to being carried in the hall to be disposed of.
6. **Resident placement** - in private room or cohort with another resident with the same MDRO. Consider previously stated resident placement guideline.

Infection Prevention and Control Guidelines for Residents with MDRO

1. Surveillance and Monitoring of Residents with a MDRO

Surveillance for MDRO in LTC facilities is very important. It allows the facility staff to know which residents are colonized or infected with MRSA and VRE, enabling them to perform appropriate measures to contain and prevent the spread of these pathogens. Additionally it provides information on whether there is an increase in transmission of MDRO infections in the facility. The following are methods to identify and track residents with a MDRO:

- Designate an individual or individuals to routinely review culture reports on all residents, so as to be aware as soon as possible when a resident becomes positive for MRSA or VRE. (Inform providers of any reports of MRSA or VRE).
- Encourage the culture of infections that may not be resolving either by incision/drainage or with a normal course of antibiotics
- Keep an active and current list of all residents colonized or with active infection of MRSA and VRE. (Appendix A includes an example of a line listing form). A line list should be used as tool for routine review and can be useful for demonstrating possible trends or clusters that may require further investigation.
- Quality improvement based review of infection rate data to determine if MRDO rates are maintaining, decreasing or increasing in each facility. The goal being to have as little transmission (lowest infection rates) as possible.

2. Acknowledgement of Residents with a MDRO

Note: Infection or colonization with MRSA or VRE cannot be the sole criteria for admission refusal or premature discharge.

- Upon admission to the facility, verify with the referring facility if the resident has had a past history of MRSA or VRE and if the resident has a current infection.
- When sending a resident to another facility (hospital or residential care), it is important for the sending facility to alert the accepting facility of the patient's diagnosis of MRSA or VRE.
- Communication between staff about the resident diagnosis of MDRO will occur in such a way that ensures proper care and safety without compromising the resident's privacy and integrity. There are different methods to facilitate staff notification. Examples of these may include labeling the resident chart, maintaining one master list of all MDRO residents, computerized care plan alerts or providing confidential signage on the door of the resident's room; i.e. "Please report to nursing station before entering room." Each facility may implement its own system for this communication.

3. Resident Placement

All residents who are infected or colonized with a MDRO should be in a private room or cohorted together, by the MDRO they carry. (i.e. MRSA residents together as roommates and VRE residents together as roommates).

- **Most Desirable:** A private room or cohort with another resident who is colonized/infected with MRSA.
- **Less Desirable:** A room with another resident who has intact skin and no "tubes" (invasive feeding tubes, tracheotomy tubes, any type of intravascular line, any type of indwelling urinary drainage tube, or any other tube or device that breaks the skin or enters into a normal body orifice).

4. Resident Hygiene

- **Hand hygiene and bathing** – teach proper hand hygiene as described above to all residents. This is the most effective method for decreasing the "bio-burden" of

organisms. The longer the interval between proper hygiene the higher the number of bacteria that can accumulate on the skin and can then be transmitted to other residents or staff. The regularity of bathing will depend upon continence, willingness and skin condition.

- **Respiratory hygiene /cough etiquette** – teach proper respiratory hygiene as described above to all residents.

5. Resident Movement about the facility

Resident Rights mandate that nursing facility residents are allowed to move about the facility at will, go to activities and events, with consideration given to the following:

- The resident has good personal hygiene, wears clean clothes daily and performs hand hygiene prior to leaving the resident's room. (The goal is to decrease the bacterial load the resident carries. The less the bacterial load, the less chance the resident will spread the MDRO to other residents.)
- Contain the area of infection by providing a dressing over draining wound advising the resident not to spit and by containment of urine or feces. If the area of infection can not be contained the resident is asked to remain in the resident's room until the infection can be contained. If a resident is unwilling staff may need to discuss alternative methods that will maintain the safety of the other residents from transmission of infection. In many facilities there is a high percentage of residents with dementia in which, again, alternative ideas for controlling transmission may need to be considered.

6. Staff

Contact Precautions are necessary when caring for a resident with a MDRO **infection**. Gloves and a gown must be worn prior to entering the resident's room if contact with the resident or environment is anticipated. A barrier such as a gown (an impervious gown is not necessary unless there is a likelihood contact with body fluids) will protect the staff person from carrying a MDRO from that resident to the next. Hand hygiene must be performed when barriers are removed and prior to leaving the resident's room. The healthcare worker must take care, once barriers are removed, not to contaminate clothing and/or hands before leaving the room.

NOTE: Use of gloves should be used for residents colonized with a MDRO. Consider donning gloves prior to any contact with the resident or the resident's environment. Risk of transmission may be highest among colonized residents as they are not on contact precautions and are freely mingling with the resident population. If ongoing transmission is recognized Contact Precautions may be recommended for all residents with a history of colonization or infection.

7. Education and Training

All healthcare workers in LTC facilities must be educated about infection control, MDRO's and in the use of Standard and Transmission based precautions; Contact and Droplet.

Residents and when possible and appropriate, families of residents with a MDRO, will be educated about the MDRO the resident carries. (An excellent resource for residents with MRSA, “Living with MRSA” booklet located on the Maine CDC website http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca.html may be used for resident and family education.) Resident education about MDRO is vitally important for the cognitively intact resident to understand why precautions are in place. Educate the resident regarding the importance of good hygiene to maintain health and reduce the risk of the reoccurrence of another infection.

8. Visitors

All visitors should be advised when meeting with residents within their room/environment to practice appropriate precautions if they are planning on visiting other residents during this encounter. Ongoing efforts to educate and facilitate hand washing by visitors are encouraged.

9. Ongoing Transmission

If after following this guideline and making proposed changes, the LTC facility is continuing to see ongoing transmission of MDRO, contact the Maine CDC at 1-800-821-5821. Field epidemiologists in your area are available for consultation in implementing these guidelines or in addressing the need for more intensive control strategies. These strategies would be considered as the next tier of control. They might include the following:

- Facility risk assessment including a point prevalence study (this looks at exactly what the rate of infection is at a given time)
- Enforced Contact Precautions for all colonized and actively infected residents
- Targeted decolonization (currently this is only recommended under specific circumstances of increased transmission.)

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8. Gould C, Rothenberg R, Steinberg J. Antibiotic Resistance in Long-Term Acute Care Hospitals: The Perfect Storm. *Infection Control and Hospital Epidemiology*. September 2006.

Resources

Websites:

1. Maine Center for Disease Control
http://www.maine.gov/dhhs/boh/disease_methicillin-resistant.htm
2. National Centers for Disease Control
http://www.cdc.gov/ncidod/dhqp/ar_MRSA_spotlight_2006.html

Field Epidemiologists:

Call 1-800-821-5821 to request contact information on the field epidemiologist in your region.

Appendix A:

MRSA Line Listing Surveillance Tool