



GUIDELINES FOR THE MANAGEMENT AND PREVENTION OF VANCOMYCIN-RESISTANT ENTEROCOCCUS (VRE) IN HEALTH CARE FACILITIES

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I. RATIONALE

Preventing the development of vancomycin-resistant enterococci (VRE), appropriately managing VRE when it does occur, and preventing spread of this organism to other individuals is critical for the following reasons:

1. Treatment of VRE infections can be difficult. At the present time, treatment is often limited to combinations of antibiotics with questionable efficacy and/or investigational agents. When treatment failures occur, they can result in increased morbidity, mortality, and health care costs.
2. The potential exists for transfer of vancomycin-resistance genes to other gram positive bacteria, including methicillin-resistant *Staphylococcus aureus* (MRSA) or methicillin-resistant *Staphylococcus epidermidis* (MRSE).

II. BACKGROUND

Enterococci are normal bacterial inhabitants of the human gastrointestinal tract. In addition, they can be found, in smaller numbers, in the female genital tract and on the skin, especially in the perineal area. Enterococci are gram positive bacteria.

The presence of enterococci can be classified into two categories:

1. *Colonization*: the bacteria is present but does not cause disease. This is the case in the normal gastrointestinal tract, female genital tract, etc. Colonization can also occur around catheter lines or in the urine, especially among frail elderly individuals.
2. *Infection*: the bacteria causes a clinically apparent infection or illness. The most common infection caused by enterococci is urinary tract infection. However, enterococci can also cause bacteremia, intra-abdominal infections, pelvic infections, wound infections, endocarditis, and neonatal sepsis. Enterococci are one of the leading causes of nosocomial infections.

Most enterococcal *infections* occur in hospitalized patients or in patients undergoing procedures which can introduce enterococci into normally sterile body sites (peritoneal or hemo-dialysis, surgical procedures, indwelling catheters, etc). Most healthy people are not at risk of serious enterococcal infections. Enterococcal infections are treated with antibiotics.

Enterococci have a remarkable ability to continually develop and acquire new mechanisms of antibiotic resistance. In recent years, some enterococcal strains have developed high level resistance to many antibiotics, including penicillins, aminoglycosides, and now vancomycin. The percentage of nosocomial enterococcal infections due to vancomycin-resistant organisms is increasing nationally. This rose from 0.3% in 1989 to 7.9% in 1993. Vancomycin-resistant enterococci have been identified in both acute and long-term health care facilities in West Virginia.

It is important to note that vancomycin-resistant enterococci are no more likely to cause infections than antibiotic-sensitive enterococci. However, infections caused by VRE are more difficult to treat than those due to antibiotic-sensitive organisms.

Risk factors for patients to develop either VRE colonization or infection include the following:

1. Severe underlying disease or immunosuppression
2. Intra-abdominal or cardio-thoracic surgical procedures
3. Indwelling urinary or central venous catheters
4. Prolonged hospital stays
5. Stays in ICUs, oncology or transplant wards
6. Multiple antimicrobial and/or vancomycin therapies

Vancomycin-resistant enterococci can develop as an alteration of an individual's own flora (associated with vancomycin and other antimicrobial usage) or can be picked up from outside sources. Transmission occurs through direct contact (e.g., contacting stool or other sites containing VRE) or through indirect contact (e.g., via contaminated thermometers, environmental surfaces, or the hands of health care workers). Transmission can occur from either colonized or infected individuals.

III. IDENTIFICATION OF VRE CASES

A VRE case is defined as an individual who has been identified by culture to be currently infected or colonized with VRE. An individual found to be VRE positive by culture should be considered to carry the organism indefinitely. Optimal requirements for determining that an individual has cleared VRE infection or colonization are not yet known; however, if criteria are felt to be necessary for management purposes, the following criteria, at minimum, are currently recommended:

1. Three consecutive cultures taken from the original culture positive site at one week intervals are negative for VRE, and
2. Three consecutive cultures, taken at 1 week intervals, from stool or rectal swabs are negative for VRE.

Health care facilities should establish their own clinical criteria for culturing and for antibiotic sensitivity testing; however, routine screening of all residents, staff, or

environmental surfaces is not recommended. If colonization or infection with VRE is detected in a facility, any future enterococcal isolates from patients in the facility should be screened for vancomycin resistance and efforts to contain the spread of VRE should be intensified. If VRE has not yet been identified in a high risk facility (e.g., tertiary care medical centers or other acute care facilities with high risk ICU, oncology, or transplant patients) and antimicrobial susceptibility testing of enterococcal isolates is not routinely performed, then periodic stool / rectal swab culture surveys or lab based antimicrobial susceptibility surveys are recommended.

IV. LABORATORY IDENTIFICATION OF VRE

The specimen needed for isolation of enterococci depends on the site of infection or colonization (blood, CSF, pus, urine, stool, etc.). Often, the most useful specimen for detecting VRE colonization is a stool or rectal swab. Specimens can be transported using most standard transport media and containers. They should be cultured as soon as possible after specimen collection, ideally within 1-2 hours.

Enterococci are gram-positive cocci that occur singly, in pairs, and in short chains. Cells are sometimes coccobacillary when the smear is prepared from agar plate growth. There are at least 19 species of enterococci. The most important include *E. faecium*, *E. faecalis*, *E. casseliflavus*, *E. gallinarum*, *E. durans*, and *E. avium*. The species identification depends on the fermentation pattern of different sugars.

Due to enterococci's propensity to develop antimicrobial resistance, all clinically relevant enterococcal isolates (including blood, other sterile body fluid, and most urinary isolates) should be tested for antibiotic susceptibilities. In cases of treatment failure, any enterococcal isolate, regardless of source, should be tested. When and what antimicrobial agents are tested depend on the site of infection, the significance of the isolate, and resources available. However, when susceptibilities are undertaken, they should, at minimum, include testing for resistance to vancomycin, ampicillin or penicillin, and high levels of aminoglycosides (gentamicin and streptomycin). Other antibiotics, as clinically relevant, may be included as well. Since enterococci are intrinsically resistant to aztreonam, cephalosporins, clindamycin, methicillin, oxacillin, trimethoprim-sulfamethoxazole, and low concentration aminoglycosides, these should not be tested.

Susceptibility testing can be done either by minimum inhibitory concentration (MIC) determination or by disk diffusion techniques with zones of inhibition read using transmitted light. In either case, results should not be read until specimens have been incubated for 24 hours. MIC determination should be done by agar dilution, agar gradient dilution, broth macrodilution, manual broth microdilution, or other NCCLS approved methods. Fully automated methods of testing enterococcal resistance to vancomycin are currently unreliable. *It is important for infection control personnel and medical providers to be certain that appropriate testing methods are utilized by their laboratory.*

If vancomycin-resistant enterococcus is identified, providers and infection control professionals should be notified immediately of preliminary results so that appropriate precautions may be taken. Vancomycin resistance should then be confirmed by repeat antimicrobial susceptibility testing. *Lab reports of vancomycin-resistant organisms should be highlighted to alert staff that infection control precautions are indicated.*

V. TREATMENT OF VRE

Many enterococcal organisms have now developed not only vancomycin resistance, but also high-level resistance to penicillins and aminoglycosides. This severely limits the ability to treat many infections due to VRE. Treatment of VRE infection should be based on antibiotic susceptibility reports. Combinations of antibiotics to which the strain appears intermediately susceptible may be tried; however, options are often limited to antimicrobial combinations of unproven clinical efficacy and investigational compounds.

Some evidence suggests that combinations of inhibitory drugs, such as doxycycline, chloramphenicol, clindamycin, rifampin and some fluoroquinolones may be effective against vancomycin-resistant enterococci. Triple combinations of cell wall active agents have often been proposed, as well as regimens of vancomycin and ampicillin plus gentamicin, drugs that have little activity by standard in vitro tests. No currently available regimen is reliably bactericidal against such organisms. If clinically relevant, a full panel of susceptibility tests should be performed as well as synergy testing between the aforementioned combinations to identify any possibly useful regimen.

One investigational drug, quinupristin / dalfopristin, is an agent of particular promise in treatment of VRE infections. This new antimicrobial belongs to the family of streptogramin antibiotics (mikamycins, pristnamycins, virginiamycins), and its spectrum of activity includes MRSA, coagulase-negative staphylococci, streptococci (including highly penicillin-resistant strains), enterococci, and anaerobes. A quinupristin / dalfopristin combination drug is currently undergoing Phase III trials and is available from the manufacturer on a compassionate use basis for the treatment of life-threatening, multiresistant gram positive infections. Other drugs in development for future use against VRE include new fluoroquinolones and oxazolidinone compounds.

There have been no methods proven efficacious for eradicating VRE colonization. *Treatment for colonization alone is not recommended.*

VI. MANAGEMENT OF VRE COLONIZED OR INFECTED INDIVIDUALS

Remember that not all cases of VRE colonization or infection are recognized. Thus, with all patients, it is crucial to use “Standard Precautions” to contain and properly dispose of body substances / articles soiled with body substances, and to promote

frequent handwashing. A summary of “Standard Precautions” can be found in Attachment B. Health care facilities should regularly review their infection control policies to assure they are adequate to prevent transmission of VRE as well as other nosocomial pathogens. It is critical to continually evaluate how effectively these policies are put into practice and to identify and remove barriers to their implementation.

Control or eradication of VRE in health care facilities is most successful when VRE infection or colonization is confined to a few patients in a localized area of the facility and when a collaborative, institution-wide, multi-disciplinary approach to preventing nosocomial transmission is undertaken. The following specific measures are important to prevent transmission of VRE.

A. Room Placement

- A VRE-infected or colonized patient should be placed in a private room or in the same room as another patient who has VRE and no other current infections. Placement in a private room or cohorting of VRE cases is strongly preferred. However, if these options are absolutely impossible, then placement must be with a resident who is not at increased risk for VRE infection (e.g., does not have vascular lines, catheters, ostomies, wounds, decubiti, etc.) and who has no history of MRSA or MRSE. These same criteria apply to individuals sharing bathroom facilities with a VRE infected or colonized person. In no circumstance should a VRE case be placed in the same room or share a bathroom with a patient with a history of MRSA or MRSE.
- As feasible, ancillary services should be performed in the patient’s room. It may be helpful to schedule out-of-room services at low traffic times or at the end of the day/shift. This allows for terminal cleaning / disinfection of equipment such as whirlpools, bathers, etc., prior to use by other patients.

B. Handwashing, Gloves, and Gowns

- Wear gloves (clean, nonsterile gloves are adequate) upon entering the room of a VRE-infected or colonized patient if likely to contact the patient or environmental surfaces. Change gloves as appropriate. Gloves should be changed in the course of patient care if soiled with potentially infectious material (e.g., stool, urine, wound drainage, etc.) and between procedures. Gloves should be removed and hands washed prior to leaving the patient’s room. This applies not only to staff caring for individual patients, but also to any staff member who will be traveling from room to room.
- Since hands can be contaminated via glove leaks or during glove removal, be certain to wash hands with an antiseptic soap or a waterless antiseptic agent immediately upon leaving the room, regardless of whether or not gloves were worn. Regular soap does not always completely remove VRE from the hands.

- The VRE case individual, other patients in the room, family members, and visitors should be encouraged to wash their hands with an antiseptic soap prior to leaving the room of a VRE case.
- Wear a gown (one that is impervious to fluids, clean, and nonsterile is adequate) when entering the room of a VRE-infected or colonized patient if substantial contact between staff clothing and the patient or the environmental surfaces in the patient's room is anticipated. This is especially important if the patient is incontinent, has an ileostomy or colostomy, has diarrhea, or has wound drainage not contained by a dressing. Gowns should be removed immediately after care and prior to contact with other patients or environmental surfaces.
- After glove / gown removal and handwashing, ensure that clothing and hands do not recontact the patient or environmental surfaces that are potentially contaminated with VRE.

C. Environmental Precautions

- Routinely used patient care equipment (i.e. stethoscopes, sphygmomanometers, thermometers, etc.) should be dedicated to a single patient or cohort of patients infected or colonized with VRE. If such equipment must be used on other patients, adequately clean and disinfect these devices first with an EPA registered hospital disinfectant.
- Rooms should be cleaned daily. Frequently contacted surfaces such as bed rails, trays, bedside commodes, doorknobs, sinks, etc. should be cleaned with an EPA registered, hospital grade disinfectant. Cleaning should occur following patient discharge, patient transfer, and use of ancillary services. With proper cleaning procedures, VRE are no more difficult to eradicate from environmental surfaces than other enterococci or similar bacteria. Disposable gloves should be used when cleaning and should be discarded prior to leaving the room.
- Laundry, dishes, and trash should be handled according to usual protocols. No additional procedures are necessary for VRE.

D. Communication / Administrative

- Notify appropriate staff promptly when VRE are detected (e.g., infection control professional / institutional epidemiologists, staff involved in direct patient care, medical provider, etc.). This allows immediate initiation of appropriate precautions to prevent transmission of VRE.
- Remind clinical staff of appropriate infection control procedures for minimizing the spread of VRE. Ongoing education of clinical staff regarding the appropriate response to VRE and strict adherence to infection control procedures are essential to preventing patient-to-patient transmission.

- Since individuals can remain colonized with VRE for long periods of time, establish and utilize a system to highlight the records of infected or colonized patients. This allows appropriate placement and prompt initiation of precautions on readmission or transfer between facilities. When possible, computerizing the information can avoid delays due to unavailable medical records.

E. Additional Issues for Specific Settings

1. Long-Term Care Facilities

- As long as reasonable personal hygiene can be maintained, a resident identified as a VRE case should not be excluded from group activities nor restricted to their room. Care should be taken to prevent stool, urine, and other body fluids from contacting environmental surfaces outside of the resident's room. VRE infected or colonized wounds should be covered with clean, dry dressings.
- A resident identified as a VRE case should wash his or her hands with an antimicrobial soap after any personal hygiene activities (e.g., toileting, bathing) and prior to attending group activities or utilizing shared materials. A resident who cannot wash his / her own hands at these times should be assisted with handwashing. Waterless antiseptic agents may be used.

2. Dialysis Centers

- Scheduling patients infected / colonized with VRE at the end of the day allows for thorough cleaning to occur.
- It may also be helpful to schedule patients infected or colonized with VRE at a time of day when the volume of other patients is low, thus decreasing the potential for cross-transmission.
- Designate an area to care for patients infected / colonized with VRE. It may be helpful to designate supplies for this area as well. Again, this both decreases the potential for cross contamination and allows for adequate cleaning.

3. Home Health Care and Home Hospice Care

- Home Health Care or Home Hospice workers should assure the availability of antiseptic soap and handwashing facilities for use between patient visits to prevent transmission of VRE.

VII. TRANSFER AND DISCHARGE OF PATIENTS

Infection or colonization with VRE, in and of itself, should not preclude transfer of patients between health care facilities. Requiring negative cultures for VRE prior to accepting transferred patients is both unreasonable and an unreliable practice. Both acute and long-term care facilities are responsible for developing and implementing appropriate policies, procedures, and education programs to prevent development of VRE, to manage VRE cases, and to prevent its spread.

In planning for and timing discharge or transfer of patients colonized or infected with VRE, it is important to consider the following:

1. The individual patient's risk of transmitting VRE: Factors influencing this include:
 - a. Which body site(s) are colonized or infected (those actively excreting body substances are more likely to result in spread of the bacteria),
 - b. How easily these secretions can be controlled (Is the patient incontinent?, How copious is wound drainage?, etc.), and
 - c. Patient behaviors that could contribute to transmission (ability to undertake personal hygiene, handwashing, etc.)
2. The available resources and capabilities of the receiving facility or location if other individuals at risk of VRE infection are present (e.g., can the facility provide the conditions necessary to minimize nosocomial spread of VRE?)

Good communication between facilities prior to transfer of VRE colonized or infected individuals is essential and is the responsibility of the discharging or referring facility. Basic information that must be provided by the referring facility to the receiving facility includes, but is not limited to, the following:

1. Dates of positive cultures for VRE and the body sites involved;
2. Whether the patient is currently infected or colonized;
3. Care the receiving facility should expect to provide to prevent VRE transmission including the type of room and toilet facilities suggested; and
4. Patient behaviors or conditions that could contribute to the transmission of VRE (incontinence, presence of copious secretions, poor personal hygiene, etc.).

In addition, the discharging or referring facility should ensure clear documentation of VRE infection or colonization on the discharge summary and transfer forms as well as advise transport personnel of any infection control measures needed during transfer.

VIII. PREVENTION STRATEGIES

A. Careful Vancomycin Usage and Review

Vancomycin is a glycopeptide antibiotic effective against most gram positive organisms. Feeling that the majority of these organisms were not and would not become resistant to vancomycin and for reasons of convenience and, sometimes, reimbursement policies, many practitioners used vancomycin extensively, and at times, inappropriately. In addition, few institutions had procedures in place to monitor use of this or other antibiotics.

Vancomycin use is clearly a risk factor for both VRE infection and colonization. More prudent use of vancomycin by medical personnel and implementation of procedures for antibiotic usage review within health care facilities are key elements in preventing the further spread of vancomycin resistance among enterococci. *Procedures for antibiotic usage review should be developed for all medical providers in all institutions where vancomycin is used -- those where VRE has already been identified and those where it has yet to be found.* Procedures should be developed with broad input from medical staff, infection control professionals, pharmacy staff, and others. In addition to preventing development of VRE, such measures may reduce the risk of developing vancomycin-resistant *Staph aureus* (VRSA), vancomycin-resistant *Staph epidermidis* (VRSE), and antibiotic resistance in other organisms. Attachment D provides a draft letter for disseminating information to medical providers on your institution's VRE prevention policies and antibiotic review procedures. Vancomycin usage recommendations published by the CDC Hospital Infection Control Practices Advisory Committee can be found in Attachment E of this document.

B. Staff Education

Educational programs to increase knowledge about VRE, to appropriately manage identified cases, to promote judicious antibiotic use, and to assure proper laboratory testing should be developed in all health care facilities and organizations. Programs should be facility specific and include all individuals participating directly and indirectly in patient care. Education programs should be regularly updated and repeated both to educate new staff and to remind continuing staff of these issues. Attachments A, B, C, D, and E may be helpful in implementing educational programs.

C. Surveillance for VRE

All health care facilities should designate an appropriate individual to maintain and regularly review a line listing or log of individuals infected or colonized by VRE. This allows tracking of VRE occurrence and identification of potential spread within the institution. Information should include patient name, location in facility, date of VRE identification, site of VRE infection or colonization, available antibiotic history, risk factors, and disposition.

In general, routine screening cultures of patients or staff are not appropriate. Depending on various factors including the incidence of VRE within the facility or nearby geographic area, the presence of significant risk factors for development of VRE in the institution, or the acceptance of numerous high risk transfers, some large health care facilities may want to intermittently undertake more detailed studies of VRE occurrence. Potential activities could include the following:

1. Point prevalence studies of VRE occurrence via periodic culture surveys of all or selected patients in high risk settings (e.g., ICU, oncology, transplant patients, etc.). Fecal screening by stool culture or rectal swab is the recommended method for undertaking such studies.
2. Studies evaluating the effectiveness of environmental cleaning procedures via focused environmental cultures before and after cleaning rooms of patients with VRE.
3. Vancomycin use surveys via chart audits to examine frequency and appropriateness of vancomycin use.

Infection control personnel / epidemiologists, physicians, pharmacists, and laboratory personnel should all be involved in designing such special studies to assure the need for the survey, appropriate design, proper implementation, and use of the data obtained.

D. Development of Institutional Policies and Procedures for VRE Control:

Adoption of written policies and procedures to prevent, detect, manage and control VRE are recommended for all health care institutions and organizations. Policies should be facility specific, for different mechanisms may be appropriate in different facilities. However, all should, at minimum, include the following: 1) infection control practices to prevent transmission of VRE from unidentified cases, 2) appropriate patient management of identified cases, 3) plans for ongoing staff education, and 4) regular evaluation of how well the policies and procedures are being implemented. The latter allows for identification and resolution of barriers to policy implementation in the practical setting. A multi-disciplinary approach to policy development and implementation is useful. Among others, this is likely to include nursing staff, medical staff, infection control, laboratory, pharmacy, and housekeeping personnel.

IX. OUTBREAK MANAGEMENT

Diligent, ongoing surveillance and record keeping in each health care facility should identify the baseline level of VRE seen in its patient population. Anytime that nosocomial transmission is suspected or an increase in cases is seen, consultation with facility infection control and epidemiology personnel should be undertaken immediately. If outbreaks are identified or three or more nosocomially transmitted VRE cases are suspected, the Division of Surveillance and Disease Control, WV Bureau for Public Health (1-800-423-1271) should be notified. This allows for discussion of the

appropriateness of screening other residents, staff, or environmental surfaces, the adequacy of infection control practices, cohorting of personnel and patients, etc. Rapidly implemented and aggressive infection control measures as well as strict compliance by staff are necessary to limit nosocomial spread of VRE.

X. IDENTIFICATION OF VRSA AND VRSE

If vancomycin-resistant *Staph aureus* (VRSA) or vancomycin-resistant *Staph epidermidis* (VRSE) are identified in the laboratory, the appropriate institution personnel should be notified immediately so that patient isolation can be implemented. Confirmatory testing should then be undertaken using standard NCCLS approved methods. Once confirmed, the Division of Surveillance and Disease Control should be notified immediately (1-800-423-1271) and the isolate sent through the WV Office of Laboratory Services (1-304-558-3530) to CDC for further verification and testing.

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VANCOMYCIN-RESISTANT ENTEROCOCCUS

Frequently Asked Questions and Answers for Employees

What is VRE?

VRE stands for Vancomycin-Resistant Enterococcus. VRE are strains of enterococcus bacteria that have developed resistance to the antibiotic vancomycin and most other antibiotics including aminoglycosides and ampicillin. An individual can be “colonized” with VRE (the bacteria is present but does not cause disease) or “infected” with VRE (the bacteria causes clinically apparent infection or illness). The most common VRE infections are urinary tract infections, wound infections, and bacteremia.

How is VRE transmitted?

Because enterococci are found in the normal gastrointestinal and female genital tracts, most enterococcal infections have been attributed to sources from within the individual patient. However, outbreaks and endemic infections caused by enterococci, including VRE, can occur through patient-to-patient transmission of the microorganism, either through direct contact or through indirect contact via the hands of health care workers or contaminated patient-care equipment / environmental surfaces.

How is VRE treated?

Only VRE infection, not colonization, is treated. VRE infection is difficult to treat because it is resistant to many antibiotics. Therapy is based on the antibiotics to which an individual isolate is sensitive. Often, however, treatment is limited to unproven combinations of antibiotics or experimental therapies. Again, VRE colonization should not be treated.

How can I prevent the spread of VRE?

The goal is to prevent spread of VRE to individuals at risk of VRE infection. “Standard Precautions” should be followed with all patients. Gloves should be worn when contacting VRE infected or colonized individuals or potentially contaminated environmental surfaces. Whether or not gloves are worn, hands should be washed before leaving the room. **Thorough hand cleaning, using an antiseptic soap and warm running water for at least 20 seconds, is the single most important measure necessary to control the spread of VRE.** Gowns are necessary if substantial contact with the patient or environmental surfaces is anticipated.

Other useful measures to prevent development or spread of VRE include the following:

- a. Prudent vancomycin use by clinicians (often best accomplished through antibiotic usage review procedures);
- b. Ongoing staff education regarding the problem of vancomycin resistance;
- c. Early detection and prompt reporting by the microbiology laboratory of vancomycin resistance in enterococci and other gram-positive microorganisms;
- d. Immediate implementation of appropriate infection-control measures to prevent person-to-person transmission of VRE when VRE are identified (i.e. handwashing, glove use, and gowns for substantial contact with the patient or the patient’s environment, use of supplies dedicated to the infected or colonized patient, and thorough environmental cleaning);
- e. Clear communication about VRE colonization or infection prior to patient transfers.

Do I need to wear a mask or eye protection?

No, unless splashing of blood and body fluids is anticipated (i.e., follow “Standard Precautions”).

Can I wear a patient gown as protective equipment?

No. An impervious / fluid-resistant gown should be utilized when a gown is needed. It does not need to be a sterile gown.

Can the VRE patient room with another patient?

Yes, with another patient colonized or infected with VRE and no other current infections. While placement in a private room or with another VRE case is strongly preferred, if this is absolutely impossible, then placement must be with a resident who is not at increased risk for VRE infection (e.g., does not have vascular lines, catheters, ostomies, wounds, decubiti, etc.) and who has no history of MRSA or MRSE.

Why can VRE patients not be placed with a patient with MRSA?

If MRSA acquired vancomycin resistance, it would become virtually untreatable by conventional methods.

Do I need to do anything special when handling linen, trash, and dishes?

No. Usual facility protocols following "Standard Precautions" are adequate for these items.

What precautions should be taken when transporting and utilizing ancillary departments?

Again, thorough handwashing by employees and the patient is crucial. Employees in ancillary departments should follow other VRE precautions, as well (e.g., gloves and gowns for substantial physical contact with the patient). Patients should be scheduled for procedures during low volume times or at the end of the day so adequate cleaning of equipment or environmental surfaces can be performed.

What precautions should the family or other visitors take?

Visitors should be encouraged to wash their hands with an antiseptic soap and water upon leaving the room of a VRE infected or colonized patient.

Can I catch VRE?

Healthy people are usually not at risk of serious, invasive VRE disease. The danger is passing it on to someone who is. Those at increased risk for VRE colonization and infection include those with severe underlying disease, immunosuppression, and indwelling urinary or central venous catheters.

Will I take VRE home to my family?

Again, healthy people are not usually at risk of serious VRE infection. While VRE can live on linens and clothing, these items generally do not transmit the organism. However, wear a protective garment at work if you are at risk of contaminating your clothing with wound or other body fluids or drainage. If you have contaminated your clothing with wound drainage or other potentially infectious body fluids, change your clothes before going home. Contaminated clothing can be washed as per manufacturer's instructions with laundry detergent and hot water. Add bleach if heavily soiled. Always thoroughly wash your hands before going home from work.

STANDARD PRECAUTIONS FOR INFECTION CONTROL

(Adopted from Infection Control and Applied Epidemiology Principles and Practice,
Association for Professionals in Infection Control and Epidemiology, Inc., 1996)

Standard Precautions apply to all patients in health care settings, regardless of their diagnosis or presumed infection status. Standard Precautions are devised to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection.

Standard Precautions are used when coming in contact with blood; body fluids, secretions, and excretions except sweat (regardless of whether or not they contain visible blood); nonintact skin; and mucous membranes.

- ◆ Handwashing is crucial. Wash hands:
 - After touching blood, body fluids, feces, or contaminated items (regardless of whether or not gloves are worn),
 - Immediately after gloves or gowns are removed,
 - As necessary, between tasks and procedures on the same patient to prevent cross-contamination of different body sites, and
 - Between all patient contacts.

- ◆ Wear clean gloves when touching blood, body fluids, feces, non-intact skin, mucus membranes, or contaminated items. Change gloves between tasks and procedures on the same patient after contact with material that may contain a high concentration of microorganisms. Remove gloves promptly after use and before touching non-contaminated items, environmental surfaces, self, or other patients.

- ◆ Wear masks, eye protection, or face shields when providing care that is likely to generate splashes of blood, body fluids, or feces.

- ◆ Wear gowns (clean and nonsterile) when providing care that is likely to generate splashes or sprays potentially soiling clothing by blood, body fluids, or feces. Remove gowns promptly after use.

- ◆ Use care in handling patient-care equipment or linen soiled with blood, body fluids, or feces in order to prevent skin and mucus membrane exposure, contamination of clothing, and transfer of microorganisms to other patients or environments. Ensure that reusable equipment is appropriately cleaned and reprocessed prior to use on another patient and that single-use items are properly discarded.

- ◆ Use “sharps” precautions to prevent injury from needles, scalpels, and other sharp-edged instruments.

- ◆ Use mouthpieces, resuscitation, or ventilation devices as alternatives to mouth-to-mouth resuscitation in areas where the need for resuscitation is predictable.

VANCOMYCIN-RESISTANT ENTEROCOCCUS

Questions and Answers for Patients and Families

What is VRE?

VRE stands for Vancomycin-Resistant Enterococcus. VRE is a type of enterococcus bacteria that has developed resistance to the antibiotic vancomycin and to most other antibiotics. An individual can be “colonized” with VRE (the bacteria is present but does not cause disease) or “infected” with VRE (the bacteria causes signs or symptoms of disease). The most common VRE infections are urinary tract infections, wound infections, and bloodstream infections.

How do individuals get VRE?

The enterococcus bacteria is a normal bacteria found in the intestines and female genital tract of many individuals. Thus, individuals with VRE infections often develop disease from the bacteria they already carry. However, person-to-person transmission of this bacteria can also occur either through direct contact (e.g., unwashed hands) or by indirect contact (e.g., via contaminated equipment or environmental surfaces).

How do you treat VRE?

Only VRE infection is treated (i.e., when the bacteria causes actual disease). Often VRE infections are difficult to treat because the organism no longer responds to many antibiotics. At times, treatment is limited to antibiotic combinations or experimental therapy. Colonization with VRE is not treated.

How will VRE impact recovery?

This depends on the individual patient and the type of VRE infection involved. Because treatment of VRE infection is often difficult, it may involve longer hospitalization and treatment with antibiotics. Health care workers will also need to take special precautions (like handwashing, use of gloves, etc.) to prevent spread of VRE to other patients. With VRE colonization (the bacteria is present but not causing disease), health care workers may need to take the same precautions to prevent spread; however, recovery from other illnesses should not be significantly affected.

How long will VRE last?

The length of illness caused by VRE infection depends upon the severity of the infection, the response to antibiotic therapy, and the individual's overall health. After infection has resolved, the individual can, but does not always, remain colonized with VRE. Some individuals are colonized with the bacteria and never develop infection. Colonization can last indefinitely.

Can I give my family members VRE infection?

Healthy people are not usually at risk of serious VRE disease. Those at increased risk include people with chronic illnesses, recent surgery, poor immune systems, and those with urinary catheters or central lines.

What precautions should be followed when I go home?

Handwashing is the most important measure. If you require continued care at home, then you, or whoever is caring for you, should wear gloves when handling body fluids (urine, wound drainage, feces, etc.) and wash hands with warm, soapy water after providing care, handling body fluids, or contacting surfaces contaminated with body fluids. Disposable items soiled with body fluids (dressings, diapers, used gloves, etc.) should be tied in a plastic bag before placing in the trash. Good household cleaning with a household disinfectant is adequate. Laundry can be done according to manufacturer's directions using standard detergent. Add bleach for items heavily soiled with body fluids. Dishes and utensils can be washed as usual.

SAMPLE LETTER TO MEDICAL PROVIDERS IN A FACILITY**SUBJECT: Prevention and Management of Vancomycin-Resistant Enterococci**

Dear Colleague:

Enterococci are a common cause of nosocomial infections and vancomycin has often been the last antibiotic available for treatment. The emergence of vancomycin resistance within enterococci is one of the most concerning infectious disease issues today. **Vancomycin-Resistant Enterococci are now being seen across West Virginia in both acute and long term care facilities.** [*Insert info on your own facility if available*]. Since the majority of strains of VRE are also resistant to ampicillin and aminoglycosides, therapeutic options are often limited to combinations of antimicrobials or experimental compounds with unproven efficacy. This leads to increased morbidity, mortality, and health care costs. There is also the possibility that vancomycin resistance genes in VRE may be transferred to other gram-positive bacteria such as *Staph aureus* or *Staph epidermidis*, making treatment of these infections equally difficult.

Vancomycin use has been consistently identified as a risk factor for colonization and infection with VRE. It is recommended that all hospitals and other health care facilities, including those where VRE have never been detected, develop guidelines for appropriate therapeutic and prophylactic use of antimicrobials, especially vancomycin. **Attached are recommendations for prudent vancomycin use published by the Centers for Disease Control and Prevention (CDC) Hospital Infection Control Practices Advisory Committee (HICPAC)** [*see attachment E or substitute your facility's recommendations*]. **We ask that each provider become familiar with and adopt such practices, thus minimizing the risk for current and future patients.** To facilitate appropriate antibiotic use, our institution has developed specific antibiotic usage review procedures [*insert information on your facilities antibiotic usage review procedures.*]

It is equally important to prevent spread of VRE once it occurs. **Nosocomial transmission of VRE has been documented via the hands of health care workers, via shared patient equipment, and via environmental contamination.** **The West Virginia VRE Workgroup, a multi-disciplinary group convened by the West Virginia Bureau for Public Health,** [*or insert a group developed by your facility*] **has published "Guidelines for the Management and Prevention of VRE in Health Care Facilities"** [*or your own facility's plan*]. **This delineates the necessary infection control measures to prevent nosocomial spread within institutions and is available from** [*insert name / location in your facility -- or attach*]. **We ask that each provider become familiar with these recommendations and assist in their implementation.**

Thank you for your assistance in addressing this serious health threat within our facility and larger community. If you have further questions or comments on this issue, please contact [*name of contact person in facility*] at [*phone number or location*].

Sincerely,

RECOMMENDATIONS FOR PRUDENT VANCOMYCIN USE

(From: "Recommendations for Preventing the Spread of Vancomycin Resistance," HICPAC, Centers for Disease Control and Prevention, 1995.)

SITUATIONS IN WHICH THE USE OF VANCOMYCIN IS APPROPRIATE OR ACCEPTABLE:

- ◆ Treatment of serious infections due to beta-lactam-resistant gram-positive microorganisms.
- ◆ Treatment of infections due to gram-positive microorganisms in patients with serious allergy to beta-lactam antimicrobials.
- ◆ Treatment of severe and potentially life-threatening antibiotic-associated colitis (AAC); or treatment of AAC that fails to respond to metronidazole therapy.
- ◆ Prophylaxis, as recommended by the American Heart Association, for endocarditis following certain procedures in patients at high risk for endocarditis.
- ◆ Prophylaxis for major surgical procedures involving implantation of prosthetic materials or devices, e.g., cardiac and vascular procedures and total hip replacement, at institutions with a high rate of infections due to methicillin-resistant *Staphylococcus aureus* (MRSA) or methicillin-resistant *Staphylococcus epidermidis* (MRSE). A single dose administered immediately before surgery is sufficient unless the procedure lasts more than 6 hours, in which case the dose should be repeated. Prophylaxis should be discontinued after a maximum of two doses.

SITUATIONS IN WHICH THE USE OF VANCOMYCIN SHOULD BE DISCOURAGED:

- Routine surgical prophylaxis other than in a patient with life-threatening allergy to beta-lactam antibiotics.
- Empiric antimicrobial therapy for a febrile neutropenic patient, unless there is strong evidence at the outset that the patient has an infection due to gram-positive microorganisms (e.g., inflamed exit site of Hickman catheter), and the prevalence of infections due to MRSA in the hospital is substantial.
- Treatment in response to a single blood culture positive for coagulase-negative staphylococcus, if other blood cultures drawn in the same time frame are negative (i.e., if contamination of blood cultures is likely).
- Continued empiric use for presumed infections in patients whose cultures are negative for beta-lactam-resistant gram-positive microorganisms.
- Systemic or local (e.g., antibiotic lock) prophylaxis for infection or colonization of indwelling central or peripheral intravascular catheters.
- Selective decontamination of the digestive tract.
- Eradication of MRSA colonization.
- Primary treatment of Antibiotic Associated Colitis.
- Routine prophylaxis for very low-birth-weight infants.
- Routine prophylaxis for patients on continuous ambulatory peritoneal dialysis or hemodialysis.
- Treatment (chosen for dosing convenience) of infections due to beta-lactam-sensitive gram-positive microorganisms in patients with renal failure.
- Use of vancomycin solution for topical application or irrigation.