Vancomycin-Resistant Enterococci (VRE)

Prepared by Roger Sanderson, R.N., MA
DOH, Bureau of Epidemiology

Enterococci are gram-positive bacteria normally found in the bowel, the female genital tract and the mouth. Some degree of drug resistance occurs naturally in these organisms. When exposed to an antibiotic drug sensitive bacteria are killed but, the drug-resistant bacteria may survive and multiply, resulting in an overgrowth of enterococci resistant to that antibiotic in the body. Enterococci are typically resistant to commonly used antibiotics such as penicillin, and treatment has depended on more recently discovered antibiotics. During the 1990's vancomycin was one of the few antibiotics available for treatment of infections due to enterococci.

Vancomycin resistance in enterococci was initially reported in 1986 in Europe. In the last decade enterococci have become recognized as a leading cause of nosocomial bacterial surgical wound infection and urinary tract infection. More than a 20 fold increase in the incidence of infection and colonization with vancomycin-resistant enterococci (VRE) has been reported from US hospitals from 1989 through 1993 (from 0.3% to 7.9%). Many VRE are now resistant to all presently available antibiotics. Several case-control and historical cohort studies show that death risk associated with antibiotic-resistant enterococcal bacteremia is severalfold higher than death risk associated with susceptible enterocccal bactermia. However, It is important to realize the VRE is neither more infectious nor more virulent than susceptible enterococci, but it is a challenge because treatment options are limited to combinations of antimicrobials or experimental compounds with unproven efficacy. In addition, there is the possibility that the vancomycin-resistant gene (VAN A gene) present in VRE may be transmitted to other gram-positive organisms, such as *Staphylococcus aureus*.

The epidemiology of VRE has not been elucidated completely; however, certain patient populations have been found to be at increased risk for VRE infection or colonization. This includes patients who: are critically ill, have severe underlying disease or immune suppression (such as ICU patients or patients in oncology or transplant wards), have renal insufficiency, have had an intra-abdominal or cardio-thoracic surgical procedure, have enteral tube feedings, have an indwelling urinary or central venous catheter, have had a prolonged hospital stay, have broad spectrum antimicrobial therapy, have received administration of oral and, to a lesser extent intravenous (IV), vancomycin. There is also some data supporting the transmission of VRE outside the health-care setting via the environment, including animal feces and human foods of animal origin and person to person.

While enterococci are part of the normal patient's flora and most infections with these microorganisms have been attributed to the patient's endogenous flora, VRE may be spread by health-care workers through either inadequate hand washing or through contact with items such as bedrails, sinks, faucets, and doorknobs. Enterococci can persist for weeks on environmental surfaces. Thus environmental surfaces may serve as potential reservoirs for nosocomial transmission of VRE and need to be considered when formulating institutional infection control policies. Studies of Long Term Care Facilities (LTCF) indicate that colonized residents may serve as a reservoir for VRE for acute-care hospitals, just as patients from acute-care-hospitals may reintroduce VRE to an LTCF.

The most important control measure in the health care setting is handwashing and following standard precautions. Other control measures include decreasing inappropriate antibiotic use, and increased communication between and within health care facilities.

One of the problems facing acute care hospitals is the refusal of some long term care facilities to admit patient's colonized with VRE. Admission to licensed facilities should never be denied on the basis of colonization or infection with multiple-antibiotic resistant organisms.

References **1/20/00**

Crossley, K the Long-Term-Care Committee of the Society for Healthcare Epidemiology of America. Vancomycin-resistant enterococci in long-term-care facilities. Infect Control Hosp Epidemiol 1998;19:521-525.

Huycke, Mark, Sahm DF, Gilmore MS. Multiple-Drug Resistant Enterococci: The Nature of the Problem and an Agenda for the Future. Emerging Infectious Diseases 1998;4(2):239-249.

Hospital Infection Control Practices Advisory Committee. Recommendation for preventing the spread of vancomycin resistance: Recommendations of the Hospital Infection Control Practice Advisory Committee (HICPAC). Am J Infect Control 1995;23:87-94.

McDonald LC, Kuehnert MJ, Tenover FC and Jarvis WR. Vancomycin-Resistant Enterococci Outside the Health-Care Setting: Prevalence, Sources, and Public Health Implications. Emerging Infectious Diseases 1997;3(3) 311-317.