

## Abstracts #1

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**TITLE** Antimicrobial Resistance: Some Complexities to Consider  
**SOURCE** Infection Control Today, December 1999; 3(12).

Historically, antibiotic resistance began shortly after the introduction of Penicillin in the 1940's. Certain strains of *Staphylococcus aureus* (*S. aureus*) were able to produce the beta-lactamase enzyme that destroys Penicillin. Thus began the development of synthetic antibiotics to combat this problem (including methicillin). Since about 1975, methicillin resistant *Staphylococcus aureus* (MRSA) has been a common nosocomial pathogen. As of 1997, 90% of *S. aureus* were resistant to beta-lactam agents.

Penicillin-resistant *Streptococcus pneumoniae* has been reported from five continents. Penicillin has historically been the antibiotic of choice for *Streptococcus pneumoniae*. Gram negative bacteria have evolved with resistant capabilities, especially to beta-lactam drugs. Vancomycin, the last silver bullet for many of the most virulent gram-positive strains, is no longer effective against many of these strains. Vancomycin-resistant enterococci (VRE) truly pose a serious issue for the health care community.

### Antibiotic resistance is a developmental result of the following factors:

- Increases in the numbers of patients with impaired host defenses serving as reservoirs for bacterial colonization and/or infection
- The development and use of new instrumentation and procedures
- The limited and often diminished resources for infection control personnel to implement necessary infection control practices (failure of adherence to strict infection control policies)
- The overuse and mis-use of the antimicrobials

Many of the lay public fail to understand that antibiotics are only effective against bacteria and are demanding antibiotics for colds and other ailments. Clinicians face overwhelming demand for a pill (antibiotic) to "fix" the ailment.

Resistance occurs through the use of one or more strategies on the part of the bacterium in order for it to survive. It may involve plasmids, transposons, or chromosomal mediation, all of which are continually being researched and understood.

MRSA is very difficult to eliminate from a clinical area and has become prevalent in the community setting. The anterior nares continue to be the predominant site of colonization and many strategies have been used to treat this site (i.e., topical mupirocin together with oral antibiotics) in order to eliminate the nasal carriage. Historically, Vancomycin was the drug of choice. Some studies show that 30-50% of all health care workers are at least transiently colonized with MRSA at some point in their career. This figure magnifies the issues facing infection control personnel. Infection control personnel must have the cooperation of all healthcare personnel in order to fight this battle.

Gram-negative bacilli have become resistant to multiple antibiotics. One study has shown that resistance can develop in as little as two days. Vancomycin-Resistant Enterococci (VRE) is an infectious disease nightmare. There are only two ways to get rid of VRE:

- spontaneous clearing after transient colonization and, for whatever reason, it clears or most probably remains at an undetectable level
- surgical excision from infected tissue

Other than this, patients either get discharged into the community or die. VRE and MRSA tend to have an inverse relationship. In a facility with high MRSA rates, VRE is experienced to a lesser degree, and vice versa. It is important to use current Centers for Disease Control and Prevention (CDC) guidelines for preventing the spread of VRE.

It is incumbent upon each one of us to monitor our standards of practice in an effort to slow this resistance phenomenon down.

This summary of a published scientific paper has been compiled by Carolyn Twomey, Clinical Nurse Consultant, Regent Medical as a service to healthcare professionals. It does not contain the complete text, and Regent Medical makes no representation as to its completeness in addressing all issues in the paper. A reprint of the original paper may be obtained through Regent Medical by Email or direct from the publishers of the journal in which it appeared.



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