



## The Impact of Antibiotic Resistance on Nosocomial Infection Control

**Paul Tambyah**

Department of Medicine  
National University of Singapore, Singapore

**A**ntibiotic resistance is a worldwide problem. This is particularly acute in resource limited settings. It is clear that apart from rare and clinically not really significant instances of antibiotic resistance arising *de novo* or of certain organisms possessing antibiotic resistant genes or mobile genetic elements, almost all antibiotic resistance in human pathogens is the result of selective pressure from the use and misuse of antibiotics. Although a large proportion of antibiotics are used in hospitals, a significant amount of antibiotic use occurs in healthcare settings very broadly defined outside the hospital including outpatient dialysis centers, outpatient clinics and day care centers. Thus selection pressures for the development of antibiotic resistance exist in both hospital and “community” settings. Traditional nosocomial infection control has been largely confined to hospitals, especially large teaching hospitals. That paradigm has to change as the practice of medicine changes. The recognition of healthcare delivery outside the hospital setting has driven the need for surveillance and control of antibiotic resistant pathogens outside the traditional hospital setting. In traditional hospitals, heightened infection control procedures are recognized as being critical controlling the spread of antibiotic resistant pathogens. This was perhaps first widely appreciated during epidemics in which mobile genetic elements carrying antibiotic resistance genes were found to be transmitted between patients. Now, it is widely recognized that any attempt to control antibiotic resistance by simple pharmacy manipulation is unlikely to succeed without concomitant attention to good nosocomial infection control. Evidence for this comes from a variety of published studies. At the same time, the traditional paradigm of pathogen specific isolation as an attempt to control antibiotic resistant pathogens (dubbed “superbugs” by the media) has been questioned. Traditionally, a patient is only isolated when an antibiotic resistant organism is identified by the clinical microbiology laboratory from a routine clinical specimen which usually occurs several days after the patient has been warded in the unit. By this time, several opportunities for the dissemination of this resistant pathogen have occurred. Several years ago, the idea of pre-emptive isolation of patients at high risk of infection or colonization with resistant pathogens was shown to be highly effective in a pediatric intensive care unit. Unfortunately, this is not widely practiced probably for logistic reasons. More recently, there are moves to use molecular methods to rapidly identify patients infected and colonized with resistant pathogens on or even before admission to the unit. Finally, it is also recognized that the risk factors for infection and colonization with MRSA, VRE and ESBL producing gram-negative bacilli are very similar. Many of these patients have heavy exposure to antibiotics and multiple comorbidities. In addition, most of these patients have a number of indwelling devices including intravascular or urinary catheters etc. These devices are readily colonized by microorganisms which form impermeable biofilms. Novel technologies to prevent the infection and colonization of medical devices clearly are an important element in any

attempt to prevent the spread of antibiotic resistance. At the same time, careful attention to good, simple infection control practices can help to reduce the reservoir for these resistant pathogens that these devices represent.