

## **Crisis In Hospital-Acquired Infections**

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# **Addressing the Growing Crisis and Cost of Hospital-Acquired Infection**



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## **Extent of Problem**

Data reported by AIHA (Controlling Hospital-Acquired Infections), from the U.S. National Nosocomial Infections Surveillance System, and by MMWR, (Feb. 2000), on the Fourth Decennial International Conference on Nosocomial and Healthcare-Associated Infections, as well as by others, indicate that every year in the United States, approximately 2,000,000 patients develop hospital-acquired infections, from which up to 100,000 die. Put another way, as expressed in the UMDNJ magazine (Spring, 2004), "Some 5-10 percent of patients entering a hospital acquire a drug resistant infection they did not have prior to admission." If one considers that there are up to 40,000,000 surgical procedures a year in the country, requiring admission to a hospital or surgicenter, aside from the millions of hospitalizations associated with nonsurgical illnesses, the serious potentials become quite evident.

## **Role of Surgery and the Operating Room Surgical Site Infections**

In an article entitled "Infection in Surgical Patients: Effects on Mortality, Hospitalization, and Postdischarge Care," DiPiro, Martindale, Bakst, Vacani, Watson and Miller, (Am J Health Syst Pharm, 1998), the authors reported a study showing that 12% of patients undergoing "moderate to high-risk surgical procedures develop hospital-acquired infections." The death rate for such patients was found to be 14.5%, compared to a death rate of 1.8% for uninfected patients. Length of stay more than tripled for infected versus uninfected patients to 14 days, as opposed to 4 days, and the number of patients requiring health care assistance after discharge was 24%, as opposed to 7% in the uninfected group. Another study, entitled "The Impact of Surgical-site Infections in the 1990's: Attributable Mortality, Excess Length of Hospitalization, and Extra Costs," published in late 1999, (Infect Control Hosp Epidemiol), reported that patients "who survive a surgical site infection are approximately 6 times more likely to be readmitted to the hospital in the 30-days following discharge, compared to uninfected patients." and that "after the inclusion of the second hospital admission, each surgical site infection was associated with an excess hospital stay of 12 days."

## **Etiology of Infection in the Operating Room**

A study in Infect Contro Hosp Epidemiol, covering the period from 1986 to 1996, showed the top, well known organisms, in order of precedence, to be Staphylococcus aureus, coagulase negative Staphylococci, Enterococcus, Eschericia coli and Pseudomonas aeruginosa. More recently, a report

from the Epidemiology Surveillance System, in a study on New Jersey hospitals, showed the three most persistent and dangerous organisms to be methicillin resistant *Staphylococcus aureus* (MRSA), Vancomycin resistant ecterococci, and gram-negative enteric bacilli. These studies should by no means reduce concerns relative to the danger of other well known diseases, such as TB, Aids, Hepatitis B and C, etc. Especially shattering is a hospital-related bloodstream infection, with mortality of up to 50% and a cost per survivor of up to \$40,000. A close second is hospital-acquired pneumonia, with a mortality rate of about 15% to as high as 71%. (Infect Control Hosp Epidemiol, 17(8):552-7 1996)

## **Special Status of Staphylococcus**

The Archives of Internal Medicine, in an analysis of the 2000 and 2001 nationwide inpatient sample database, entitled "The Burden of *Staphylococcus aureus* Infections on Hospitals in the United States," stated "Inpatients with *S aureus* infection had, on average, 3 times the length of hospital stay (14.3 vs 4.5 days); 3 times the total charges (\$48,824 vs \$14,141); and 5 times the risk of hospital death (11.2% vs 2.3%), than inpatients without this infection." They concluded "The potential benefits to hospitals in terms of reduced use of resources and costs as well as improved outcomes from preventing *S aureus* infections are significant"..."In summary, *S aureus* infections represent a considerable cost burden to US hospitals. Almost 1% of all US hospital stays involve an *S aureus* infection. On a national level, the burden of *S aureus* infections is staggering: almost 12,000 inpatient deaths annually and an estimated 2.7 million days in excess LOS and \$9.5 billion in excess charges."

## **Remedies**

The overall, vast problem of infectious disease, with the role of research for newer and more effective antibiotics, the more rational use of those we have, vaccines, and new approaches as yet on the horizon, are beyond the scope of this small review. Our purpose here is to reinvigorate our use of our considerable stores of knowledge and time proven techniques, which are easily at hand to protect the patient and the health care provider in the operating room and other venues of care. It is well documented that hand washing, instrument cleansing and sterilization (where disposable items are not feasible), environmental controls, barriers against disease transmission to health care personnel and protection from contamination of all surfaces relative to the operating room, the patient and health care workers, are very effective in the prevention of disease transmission in the immediate area. The last admonition may be one of the most prone to neglect. The use of disinfectants on inanimate objects and surfaces in the operating room may be employed to a lesser or greater degree, depending on the operating room protocol, but the failure to recognize that the use of such surfaces for contaminated instruments and other objects is a ready cause of transmission of organisms to the current patient, the health care personnel or the next patient, is of considerable significance.

## **Efficacy of Corrective Measures**

The recognition of the seriousness of the problem should by no means create ennui in the face of the task. Simple and logical solutions, undertaken in a positive spirit, can be effective, both in terms of patient care and cost effectiveness, as in the case of the steady rise of deep sterna infections, post cardiac surgery, in a large tertiary care hospital. (see NAHQ, January February, 2004). Changing the preop protocol to include a Chlorhexadine shower, discontinuation of shaving, antibiotics in the holding area and an insulin protocol, resulted in a significant decrease in deep sternal and leg infections and provided a total of \$200,000 in cost saving within one year. Similar vigilance on the part of health care providers to find root causes of infection and to employ their best efforts to improve the situation should yield similar results.