

## Food Borne Diseases: Healthcare Staff, High and Low Hospital Contact Surfaces

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**Abstract:** Health care staff and hospital surfaces have important role in spread and transmission food borne illness bacteria in hospital. Control bacterial population in health care staff and hospital surfaces; lead to control these bacteria in hospital. Bacteria on hospital surfaces have low potential to spread. Health care staffs are more sources to transmission bacteria into hospital. Increase health care staff and hospital surfaces hygiene has been considered the most important tool in control of transmission food borne illness bacteria.

**Key words:** Health care staff, High Hospital Contact Surfaces, Low Hospital Contact Surfaces, Food borne Diseases

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### INTRODUCTION

Nosocomial infections occur worldwide and affect both developed and resource-poor countries. Infections acquired in health care settings are among the major causes of death and increased morbidity among hospitalized patients. They are a significant burden both for the patient and for public health. A prevalence survey conducted under the auspices of WHO in 55 hospitals of 14 countries representing four WHO Regions showed an average of 8.7% of hospital patients had nosocomial infections. At any time, over 1.4 million people worldwide suffer from infectious complications acquired in hospital (Mayon *et al.*, 1998).

The highest frequencies of nosocomial infections were reported from hospitals in the Eastern Mediterranean and South-East Asia Regions (11.8 and 10.0% respectively), with a prevalence of 7.7 and 9.0% respectively in the European and Western Pacific Regions. The surface would be considered one of a number of potential reservoirs for the pathogen, but not the de facto source of exposure. An understanding of how infection occurs after exposure, based on the principles of the chain of infection is also important in evaluating the contribution of the environment to health-care-associated disease. All of the components of the chain must be operational for infection to occur:

1. Adequate number of pathogenic organisms (dose).
2. Pathogenic organisms of sufficient virulence.
3. A susceptible host;
4. An appropriate mode of transmission or transfer of the organism in sufficient number from source to host.
5. The correct portal of entry into the host.

Although microbiologically contaminated surfaces can serve as reservoirs of potential pathogens, these surfaces generally are not directly associated with transmission of infections to either staff or patients. The transfer of microorganisms from environmental surfaces to patients is largely via hand contact with the surface. *S. aureus*, *Escherichia coli* and spore forming bacteria are the most bacteria causing food borne diseases in hospital and community. *S. aureus* is the most common gram-positive bacterium causing NIs (Mayon *et al.*, 1998). Its frequency among all pathogens in NIs varies between 11.1 and 17.2% (Sartor *et al.*, 1995). Methicillin resistance in *S. aureus* (MRSA) is increasing worldwide (Schmitz and Verhoef, 1999; Barbut and Petit, 2001; Daschner, 1985; Guenther *et al.*, 1987; Larson, 1981; Mayon-White and Duce, 1988; McBride and Duncan, 1975; McFarland and Mulligan, 1989).

Leading not only to NIs but recently also to community-acquired infection. Colonization of health care workers' hands with *S. aureus* has been described to range between 10.5 and 78.3%. Up to 24,000,000 cells can be found per hand. The colonization rate with *S. aureus* was higher among doctors (36%) than among nurses (18%), as was the bacterial density of *S. aureus* on the hands (21 and 5%, respectively, with more than 1,000 CFU per hand) (Daschner, 1985). The carrier rate may be up to 28% if the health care worker contacts patients with an atopic dermatitis, which is colonized by *S. aureus* (Williams *et al.*, 1999; Mille and Hyland, 2002; Richards and Edwards, 1999).

MRSA has been isolated from the hands of up to 16.9% of health care workers. VRE can be found on the hands of up to 41% of health care workers. Hand carriage of pathogens such as *S. aureus*, MRSA, or *S. epidermidis* has repeatedly been associated with different types of NI. The analysis of outbreaks revealed that dermatitis on the hands of health care workers was a risk factor for colonization or for inadequate hand hygiene, resulting in various types of NI. Transmissibility of VRE has also been demonstrated. The hands and gloves of 44 health care workers were sampled after care of VRE-positive patients. Gloves were VRE positive for 17 of 44

healthcare workers, and hands were positive for 5 of 44, even though they had worn gloves (Tenorio and Badri, 2001).

One health care worker was even VRE positive on the hands although the culture from the glove was negative (Tenorio and Badri, 2001). *S. aureus* can survive on hands for at least 150 min; VRE survives on hands or gloves for up to 60 min. On inanimate surfaces, *S. aureus* and MRSA may survive for 7 months, with wild strains surviving longer than laboratory strains. VRE may survive on surfaces for 4 months. The long survival on surfaces, together with the relatively short survival on hands, suggests that contaminated surfaces may well be the source of transient colonization despite negative hand cultures. *Escherichia coli* is the most common gram-negative bacterium, causing mainly NIs (Richards and Edwards, 1999).

Colonization with gram-negative bacteria is influenced by various factors. For example, it is higher before patient contact than after the work shift (Guenther and Hendley, 1987). Hands with artificial fingernails harbor gram-negative bacteria more often than those without. Higher colonization rates with gram-negative bacteria also occur during periods of higher ambient temperature and high air humidity (McBride and Duncan, 1975). Transient hand carriage of various gram-negative bacterial species has quite often been suspected to be responsible for cross-transmission during outbreaks resulting in various types of NI. Most gram-negative bacteria survive on the hands for 1 h or more. Survival on inanimate surfaces has been reported to be different for the different gram-negative species, with most of them surviving for many months. In general, gram-negative bacteria survive for longer on inanimate surfaces than on human skin. The main spore-forming bacterium causing NIs is *Clostridium difficile*. It is estimated that between 15 and 55% of all cases of nosocomial antibiotic-associated diarrhea are caused by *C. difficile* (Barbut and Petit, 2001). Patients with diarrhea caused by *C. difficile* have on average 3.6 additional hospital days attributable to the NI; the overall mortality is 15%.

Extra intestinal manifestations are very uncommon (1%). Patients can be contaminated from, for instance, the hands of hospital personnel and from inanimate surfaces (Barbut and Petit, 2001). In one study, the hands of 59% of 35 health care workers were *C. difficile* positive after direct contact with culture-positive patients. Colonization was found mainly in the subungual area (43%), on the fingertips (37%), on the palm (37%), and under rings (20%) (McFarland and Mulligan, 1989). In another study, 14% of 73 health care workers were culture positive for *C. difficile* on their hands. The presence of *C. difficile* on the hands correlated with the density of environmental contamination. Transmission of *C. difficile* in an endemic setting on a general medical ward has been shown to occur in 21% of patients, with 37% of them suffering from diarrhea. Another spore-forming bacterium has been described as well: *B. cereus* was transmitted to the umbilicus in 49% of newborns on a maternity ward; the hands of 15% of the health care workers were found to be culture positive. Vegetative cells of *C. difficile* can survive for at least 24 h on inanimate surfaces, and spores survive for up to 5 months.

### Conclusion:

About importance staff hands and hospital surfaces in transmission Food borne Illness Bacteria in hospital in articles, there is consensus that control Bacterial population in these sources, lead to control these Bacteria in hospital. Nosocomial infections (NIs) remain a major global concern. Overall, national prevalence rates have been described as ranging between 3.5 and 9.9%. They lead to additional days of treatment, increase the risk of death, and increase treatment costs. Staff hands and hospital surfaces have important role in Nis. Bacteria on hospital surfaces have low potential to spread. Staff hands have very contact with hospital surfaces and are more sources to transmission Bacteria into hospital. Increase Staff Hand and hospital surfaces hygiene has been considered the most important tool in control of transmission Food borne Illness Bacteria (Sartor *et al.*, 1995; Schmitz and Verhoef, 1999; Tenorio and Badri, 2001; Williams *et al.*, 1999).

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