

Letters to the Editor

Compliance With Hand Washing

To the Editor:

Gina Pugliese and Martin Favero¹ provided a summary of reviews associated with compliance with hand washing. Also, they noted that there were some concerns related to using gloves as an alternative to hand washing. These concerns are quite valid and require attention in many patient-care settings.

Our facility treats pediatric burns exclusively, and over the past 2 years we had observed a gradual rise in the nosocomial infection rate. Thus, we undertook several reviews to attempt to identify causal relationships. One observation was that our overall glove use also gradually seemed to increase beyond what would be expected for the number and types of burn injuries being treated. Therefore, one focus of our review concentrated on how gloves were being used and, in some cases, why they were used.

A combination of daily observations and environmental cultures quickly identified the following three potential risk areas:

- Gloves, in some cases, were being used as a substitute for hand washing.
- The surface areas around the openings to the glove boxes were being contaminated with organisms that were on the hands of personnel who reached into the box.
- Fingers, thumbs, and other areas of gloves, as they were removed from the boxes, were being contaminated with organisms that were on the hands of those removing gloves from the box.

The deposition of organisms on the glove box or on the gloves themselves was influenced by hand washing. The number and types of organisms deposited decreased if the hands were washed. However, since many personnel were using gloves as a substitute for hand washing, the organism deposition was elevated. Contact plates applied to areas of the openings of glove boxes indicated that as many as 278 colony-forming units (CFU)

were present on some half-full boxes. Most boxes, however, had less than 30 to 40 CFU per 57-mm contact plate.

The presence of organisms, especially gram-positive cocci, on fingers, thumbs, and other contacted surfaces of gloves has been observed by others.² During our initial study, coagulase-negative *Staphylococcus* (CNS) was observed on all of the 40 glove boxes from which cultures were obtained. Also, the following organisms were found: methicillin-sensitive *Staphylococcus aureus* (MSSA), 7%; methicillin-resistant *S aureus* (MRSA), 2%; *Micrococcus* species, 35%; *Bacillus* species, 45%; fungus species, 7%; non-hemolytic *Streptococcus*, 14%; and *Acinetobacter* species, 4%. Cultures of the gloves from 33 of the boxes demonstrated a similar flora: CNS, 94%; MSSA, 18%; MRSA, 6%; *Micrococcus* species, 36%; and *Bacillus* species, 39%. Cultures of control boxes of gloves did not yield any of these organisms on the gloves. Also, contact plate cultures of the "opening areas" of unopened boxes only rarely produced CNS, *Bacillus* species, and fungus species. No *S aureus* or other skin flora was observed.

While no data were obtained to prove that organisms on or in glove boxes were transferred to patients, the presence of these organisms suggested that it would be prudent to undertake some measure of control. Also, the transfer of organisms from the hands to the contacted surfaces of gloves was of sufficient concern that we felt it necessary to undertake measures to control this transfer. Several tests were conducted to attempt to reduce the organism transfer to the gloves, and it became quite apparent that the design of the glove box was a major problem. Thus, a somewhat drastic measure was implemented: the tops of all glove boxes used in all 14 of our acute patient rooms were removed.

The removal of the top of the box was done to allow patient-care staff to remove the gloves by the cuff end of the glove. Thus, no organisms would be transferred to the fingers, thumbs, or other patient-contact portions of the gloves. Initially, this was a somewhat cumbersome task and required care-

ful use of a shielded razor blade. However, the box top removal became very simple when we found a brand of nitrile gloves (NITRI-CARE nonlatex, 100% nitrile, powder-free examination gloves; Best Manufacturing Co, Menlo, GA) that had a flip-top box lid.

We began 100% usage of this new glove, with removal of the box top, in mid-January. Our 1999 infection rate has dropped to zero. While we have had only 3 months' experience, we feel that the box-top removal prevents the transfer of organisms to the patient-contact portion of the glove if the glove is removed by the cuff end.

We have revised our training programs to place renewed emphasis on hand washing and to demonstrate the importance of the glove box-top removal and the cuff-end removal of gloves from the box. Observations made by infection control personnel and patient-care supervisors have suggested a high rate of compliance with cuff-end removal of gloves from the box. These procedures also have helped address specific handwashing compliance issues or inappropriate glove use. Likewise, they have suggested to us that proper removal of gloves from the box may be a very important element in the overall reduction of organism transfer in a burn treatment facility.

REFERENCES

1. Pugliese G, Favero MS. Compliance with hand washing. *Infect Control Hosp Epidemiol* 1999;20:114.
2. Hannigan P, Shields JW. Handwashing and use of examination gloves. *Lancet* 1998; 351:571.

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Cost of Nosocomial Infections in Wuhan No. 4 Hospital, China

To the Editor:

Nosocomial infection (NI) not only adds to patients' pain, prolongs their length of hospitalization, even