

Alcohol-Based Hand Gels and Hand Hygiene (8/08)

Rupp ME, Fitzgerald T, Puumala S, Anderson JR, Craig R, Iwen PC, Jourdan D, Keuchel J, Marion N, Peterson D, Sholtz L, Smith V. Prospective, controlled, cross-over trial of alcohol-based hand gel in critical care units. *Infect Control Hosp Epidemiol* 2008;29:8–15.

The data is limited from prospective studies to indicate whether improvement in hand hygiene associated with the use of alcohol-based hand-hygiene products results in improved patient outcomes. The study, a two-year, prospective, controlled, cross-over trial of alcohol-based hand gel, was conducted in two medical-surgical intensive care units for adults at a university-associated, tertiary care teaching hospital. An alcohol-based hand gel was provided in one unit and not provided in the other. After one year, the assignment was reversed. The hand-hygiene adherence rate and the incidence of health-care-associated infections were monitored. Every two months samples for culture were obtained from nurses' hands. During 17,994 minutes of observation, which included 3,678 opportunities for hand hygiene, adherence rates improved dramatically after the introduction of hand gel, increasing from 37% to 68% in one unit and from 38% to 69% in the other unit ($P < 0.001$). Improvement was observed among all groups of health-care workers. Hand-hygiene rates were better at higher workloads when hand gel was available in the unit ($P = 0.02$). No substantial change in the rates of device-associated infection, infection due to multidrug-resistant pathogens, or infection due to *Clostridium difficile* was observed. Samples from the hands of nursing staff revealed that an increased number of microbes and an increased number of microbe species was associated with longer fingernails (i.e., more than 2 mm long), the wearing of rings, and/or lack of access to hand gel. **The introduction of alcohol-based gel resulted in a significant and sustained improvement in the rate of hand hygiene adherence. Fingernail length greater than 2 mm, wearing rings, and lack of access to hand gel were associated with increased microbial carriage on the hands. This improvement in the hand-hygiene adherence rate was not associated with detectable changes in the incidence of health-care-associated infection.**



DECS Comment: Although the present study did not find a significant relationship between hand-hygiene adherence rates and the occurrence of health-care associated infection, this may have been a result of the small sample size, an already low infection rate, and the length of the investigation. This study also looked at the impact of an alcohol-based hand gel on adherence to hand-hygiene recommendations and the number of organisms found on health-care personnel hands. Traditionally, compliance with recommended hand-hygiene procedures has been poor with an overall average rate of only 40% in hospital settings. Because of this, the Centers for Disease Control and Prevention (CDC) recommend the use of alcohol-based hand products primarily to increase compliance in hospital settings. In the present study, there was a significant association between the availability of the alcohol-based hand gel and adherence to hand-hygiene recommendations. Overall, the use of the alcohol-based gel was associated with a lower number of microbes on the hands, but the number of microorganisms increased with increasing nail length (> 2 mm). Artificial nails were prohibited at this facility, so no use of artificial nails was noted during this study. Furthermore, wearing at least one ring on the dominant hand was significantly associated with the number of species of microbes recovered and with the carriage of gram-negative bacilli.

Keeping nails short is considered key because the majority of flora on the hands are found under and around the fingernails. Hand carriage of gram-negative organisms has been determined to be greater among wearers of artificial nails than among nonwearers, both before and after handwashing. Fingernails should be short enough to allow dental health-care personnel (DHCP) to thoroughly clean underneath them and prevent glove tears. Sharp nail edges or broken nails

are also likely to increase glove failure and long artificial or natural nails can make donning gloves more difficult and can cause gloves to tear more readily. Whether wearing rings increases the likelihood of transmitting a pathogen is unknown; further studies are needed to establish whether rings result in higher transmission of pathogens in health-care settings. However, rings and decorative nail jewelry can make donning gloves more difficult and cause gloves to tear more readily. Thus, jewelry should not interfere with glove use (e.g., impair ability to wear the correct-sized glove or alter glove integrity).

In A Nutshell: USAF Guidelines for Infection Control in Dentistry

- Perform hand hygiene with either a nonantimicrobial or antimicrobial soap and water when hands are visibly dirty or contaminated with blood or OPIM. If hands are not visibly soiled, an alcohol-based hand rub can also be used. Follow the manufacturers instructions.
- Keep fingernails short with smooth, filed edges to allow thorough cleaning and prevent glove tears. Long nails make glove placement more difficult and may result in glove perforation.
- Follow MTF policy regarding artificial fingernails. Use of artificial fingernails is usually not recommended.
- Chipped nail polish can harbor bacteria. Unchipped nail polish on short natural nails is acceptable.
- Do not wear hand or nail jewelry if it makes donning gloves more difficult or compromises the fit and integrity of the glove.