



# Factors determining poor practice in alcoholic gel hand rub technique in hospital workers

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## KEYWORDS

Alcohol-based hand-rubs;  
Compliance;  
Nosocomial infections;  
Education program;  
Risk factor analysis

## Summary

**Background:** Hand hygiene of healthcare personnel is one of the most important interventions for reducing transmission of nosocomial pathogens. Previous studies have demonstrated that the use of alcohol-based hand gel increases hand hygiene compliance, but that effective use of this product cannot be taken for granted.

**Objective:** Evaluate factors associated with poor hand hygiene effectiveness of hospital workers using an alcohol-based hand gel and the effect of an education program.

**Design:** A direct observational prospective study of hand hygiene effectiveness prior to training and immediately after training.

**Setting and subjects:** 3067 hospital workers of different professional categories in several hospital units in the University Hospital of Nancy (France).

**Results:** Time after program start (OR 0.97, 95%CI 0.96–0.97) and being female (OR 0.37, 0.24–0.58) were highly associated with increased effectiveness of hand hygiene prior to training. Wearing rings other than a wedding ring (OR 1.8, 1.2–2.7), a bracelet (OR 2.0, 1.1–3.6), a watch (OR 1.9, 1.3–2.9) and having long nails were associated with ineffective hand rub use. Professional background was also a strong predictor with nurses and especially senior nurses demonstrating much better effectiveness than all other professional groups. Wearing wedding rings or long sleeves, and having varnished nails, visibly dirty hands prior to washing and cutaneous lesions were not associated with effective gel use.

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*Conclusion:* These results demonstrate that an educational program can significantly improve the proper practices for using hand rub and hand washing compliance. This study has also demonstrated that wearing rings, bracelets, watches and long nails impair hand gel application but that wedding rings, long sleeves and varnished nails do not. The finding of that hand hygiene effectiveness increased with time even prior to training indicates that knowledge gained by staff trained early diffused into those who had not yet been trained.

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## Introduction

Nosocomial infections are associated with significant increase in morbidity and health care costs [1]. Good hand hygiene and good antimicrobial prescription practices are considered as the most important measures for preventing nosocomial infections [2–6]. However, compliance with hand washing guidelines in hospital environments is generally less than 50% [7]. Reasons for insufficient compliance have been investigated [8]. Hand washing may be inadequate because of workload pressures and may vary between professional groups and clinical specialties. Factors associated with compliance with hand washing include the professional group (medical students and doctors wash their hands less frequently and effectively than other health care workers), male sex (less effective), clinical specialties (intensive care nurses were more effective), working at week-end, lack of time and high patient care load, lack of training and information, and “cutaneous intolerance” (all less effective) [7,9–12]. Generally, compliance decreases when the need for hand washing increases [13].

Several studies have proved that compliance with hand washing could be improved [14–16]. However, it is necessary to have an multiple intervention at the same time to make a sustained impact on the complex relation between health care workers and hands [17]. Education and information have also a very significant role [9,18,19].

Studies show that using alcohol-based hand rubs (ABHR) versus conventional antiseptic soap [20] increases hand washing compliance and frequency [21,22] and decreases nosocomial infections [23]. ABHR may help to overcome many obstacles to hand washing: they allow fast hand hygiene during patient care, achieve rapid microbial killing and may even improve the hand’s skin condition [24–26]. Thus, one objective of the 2005–2008 French National Program for nosocomial infections prevention was to increase ABHR consumption. An

index of ABHR consumption is now one of the key indicators in the dashboard of the French National Program.

The aim of this study is to investigate factors that may explain the bad practices in hospital workers use of alcohol-based hand gel and the impact that an educational program had on the prevalence of this bad practices.

## Methods

### Setting and study subjects

The Nosocomial Infections Committee and Quality and Customers Directorate of University Hospital of Nancy instigated the provision of ABHR throughout the hospital in areas where there is staff patients contact. Some 3000 distributors were installed: in patient’s rooms, ward blocks, treatment’s rooms, consultations, etc.). Training sessions for all hospital workers were organized and a campaign of information and sensitization to accompany the change of practice directed at personnel, patients and patients’ families [28]. The standard training session was based on an individual assessment of hand washing practice by using fluorescent gel to evaluate the quality of the application, on a double application of ABHR to measure the progress evaluated by a questionnaire at the end of the formation.

This study was carried out in all hospital units of the University Hospital Centre of Nancy (France) which comprises medical, intensive care, surgical units, administration, technical services, emergencies and medical imagery. In the DEESSES cohort, all professional categories were observed: nurses, stretcher-bearers, ancillary staff, medical doctors, physiotherapists, occupational therapists, secretaries, and technicians but this analysis excluded the medical doctors because of lack of availability of key administrative data. In this cohort we want to observe the evolution of the hand rub practice during 10 years.

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