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REFERENCES

- Whitby M, McLaws M, Ross M. Why health care workers don't wash their hands: a behavioral explanation. *Infect Control Hosp Epidemiol* 2006; 27:484-492.
- Trampuz A, Widmer AF. Hand hygiene: a frequently missed lifesaving opportunity during patient care. *Mayo Clin Proc* 2004; 79:109-116.
- Voss A, Widmer AF. No time for handwashing!? Handwashing versus alcoholic rub: can we afford 100% compliance? *Infect Control Hosp Epidemiol* 1997; 18:205-208.
- Widmer AF. Infection control and prevention strategies in the ICU. *Infect Dis Digest* 1995; 2:13-14.
- Andersen BM, Lindemann R, Bergh K, et al. Spread of methicillin-resistant *Staphylococcus aureus* in a neonatal intensive unit associated with understaffing, overcrowding and mixing of patients. *J Hosp Infect* 2002; 50:18-24.
- Eckmanns T, Rath A, Ruden H, Gastmeier P, Daschner F. Outbreak of *Enterobacter cloacae* related to understaffing, overcrowding, and poor hygiene practices. *Infect Control Hosp Epidemiol* 2000; 21:305-307.

Reply to Widmer

TO THE EDITORS—We thank Dr. Widmer¹ for his comments on our article,² but believe that he has misunderstood both our methodology and conclusions. Dr. Widmer¹ makes criticisms in 4 broad areas: methodology, nonresponders, external generalizability, and the benefits of using alcohol-based hand gel.

With respect to methodology, although clinicians are usually more familiar with research outcomes grounded in numerical associations, the use of focus groups is a validated methodology in behavioral science^{3,4} and has been widely applied for some decades to many areas of research, including medicine and commercial market research. Focus groups are designed to explore uncertain or unknown paradigms of behavior and to determine the uniformity or nonuniformity of participants' perceptions by means of thematic analysis. Our presentation of statements made by participants during focus group discussions (Tables 1–4 of our article²) is conventional practice and is designed to reflect common and consensual themes detected in all focus groups. These are not just the opinions of selected individuals.

With respect to the issue of nonresponders, the reasons that 39% of nurses chose not to complete our questionnaire are unknown; this is an issue common to all studies in which participation is by choice and subjects remain anonymous. Individual response rates for each of the questions in our

survey were omitted for brevity—our analyses did, however, use sophisticated modeling in which those participants whose responses were incomplete for items being tested were excluded. The variance (R^2) values illustrated represent a more informative statistic. They indicate the proportion of the behavior that is explained by the predictors in the model; this is reliant on response rate. Our model explained a high proportion (62% and 76%) of the variance in hand hygiene behaviors; models that explain only 30%–40% of the variance in a complex behavior are regarded as acceptable.

With respect to external generalizability, we disagree with Dr. Widmer's conclusions that our findings are not relevant to Europe or, for that matter, North America.¹ Contrary to his suggestion, alcohol-based hand rub is not widely used in the Australian community. Of more import, the shared history, traditions, and cultural values of the nations within Europe, North America, and Australia suggest that it is very likely our findings are applicable to healthcare workers from all of these areas.

We have also provided evidence from work in Africa that may suggest the universality of our conclusions in relation to handwashing. This needs further study and we are currently repeating our investigations in the People's Republic of China, a country with a sophisticated community structure but without culture and traditions inherited from Europe.

With respect to the benefits of alcohol-based gel, we are aware that healthcare workers frequently cite a lack of time as their reason for noncompliance with hand hygiene protocols. We do not dispute this assertion but have argued, on the basis of our focus group discussions and modeling evidence, that this applies only to the elective component of hand hygiene behavior. In those circumstances where healthcare workers perceive a risk to themselves (ie, "inherent" handwashing), they are highly likely to wash their hands regardless of time constraints. It may well be, as we state in our paper, that the availability of alcohol-based gel facilitates improved elective hand hygiene behavior by reducing the time necessary to clean the hands. However, our findings strongly indicate that the effect of introduction of alcohol-based gel alone is small, and the potential response to the modification of other behaviors that drive compliance is much greater. We readily agree with Dr. Widmer¹ that changing behavior is a difficult process; given our failure over the past 25 years to influence hand hygiene compliance using authority, education, and reinforcement as techniques, an approach focused on identifying and targeting significant facilitators of this behavior may offer greater promise.

Finally, we do not decry the use of alcohol-based hand rub in hospitals and are familiar with the World Health Organization (WHO) Hand Hygiene Program (M.W. and M.-L.M. are members of the WHO Technical Advisory Committee on Handwashing). However, the hand hygiene practices of healthcare workers are learned behaviors from childhood, which are continued in a professional context and reinforced in everyone's daily lives. We strongly caution against un-

realistic expectations that entrenched, longstanding behavior patterns will be changed in a sustained fashion solely by the introduction of a new hand hygiene product.

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REFERENCES

1. Widmer, A. Behavioral explanation of noncompliance with hand hygiene. *Infect Control Hosp Epidemiol* 2007; 28:XXX-XX.
2. Whitby M, McLaws M-L, Ross M. Why healthcare workers don't wash their hands: a behavioral explanation. *Infect Control Hosp Epidemiol* 2006; 27:484-492.
3. Hansen EC. *Successful qualitative health research: a practical introduction*. Thousand Oaks, CA: Sage; 2006.
4. Powell RA, Single HM. Focus groups. *Int J Qual Health Care* 1996; 8: 499-504.

What is the Optimum Location of Alcohol-Based Hand Cleanser?

TO THE EDITOR—Approximately 10% of hospital patients acquire a healthcare-associated infection, and it has been estimated that approximately one-third of these infections could be prevented. Improving compliance with hand hygiene is recognized as a key intervention which is likely to be cost saving.¹ Alcohol-based preparations remove organisms effectively and more efficiently than antiseptic soap.² Their use is also less time consuming, irritates hands less, and can improve compliance among healthcare workers.³ These preparations have been proposed as an alternative to conventional hand washing in many situations and have been widely adopted.⁴ We undertook a study to evaluate the optimum location of alcohol-based handwashing products to promote their use and improve hand hygiene.

The study was carried out in the general surgical unit at the Royal Infirmary of Edinburgh. The unit comprises 6 wards where approximately 100 members of medical, nursing,

and ancillary staff work. On these wards there are a total of 72 beds, 56 in quadruple-bed rooms and 16 single-bed side rooms. Each room contains a sink equipped with alcohol and soap dispensers and a bathroom with a sink and soap dispenser. There was also an alcohol-based hand cleanser (ABHC) dispenser at the foot of every bed. Staff at the Royal Infirmary of Edinburgh do not routinely carry personal ABHC gel dispensers, but they have had access to ABHC on the walls by the sinks since the opening of the hospital (approximately 1 year prior to the study). The ABHC dispensers at the end of the bed had been in place for 2 weeks prior to commencement of this study.

Soap and ABHC dispensers were weighed after hours, when a minimum number of staff would be present. No information was given as to why the measurements were being taken and the study was not publicized, to minimize the effect that knowledge of the study might have on compliance. All dispensers were nearly full at the beginning of this study and none were emptied completely over the course of the study. Each week it was verified that the same dispenser was in situ and had not been replaced. Dispensers were weighed at baseline and once weekly for 2 consecutive weeks. ABHC dispensers at the foot of beds had the level marked with pen at baseline and weekly for 2 consecutive weeks. The data was compiled in an Excel spreadsheet (Microsoft) and analyzed with SPSS software (SPSS) using the Friedman test.

There was a significant difference in the quantity of ABHC used per patient per week, depending on whether the ABHC was dispensed at the foot of the bed or at the wall by the sink (mean weight dispensed, 23.75 vs 15.44 g; $P = .005$) (Figure). There was no significant difference between the amount of ABHC used in the consecutive weeks of the study ($P = .42$), so the results were combined for further analysis. There was no significant difference in the amount of ABHC or soap used per patient in single-bed rooms and quadruple-bed rooms.

Our study demonstrates that hands are cleansed both with

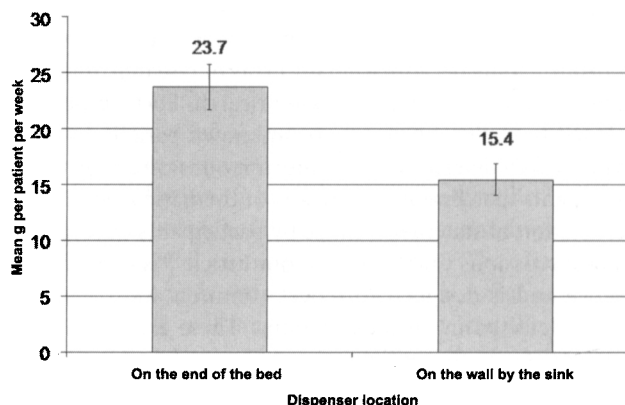


FIGURE. Mean weight of alcohol-based hand cleanser used per patient per week for the 2 types of dispensers evaluated. Whiskers, standard error of the mean