

Assessing the sustainability of hand hygiene adherence prior to patient contact in the emergency department: A 1-year postintervention evaluation

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Background: Health care-associated infection is one of the most important patient safety problems in the world. While many methods exist to prevent health care-associated infection, most experts believe that improving hand hygiene is paramount. We previously published the results of a successful before-and-after hand hygiene interventional study performed in the pediatric emergency department of the Meyer Hospital in Florence, Italy. The goal of the current study is to assess the longer term sustainability of the previously described intervention.

Methods: Direct observation was used to assess hand hygiene compliance for both doctors and nurses in the emergency department using the same methods and observers as previously employed.

Results: In addition to the 420 preintervention and 463 immediately postintervention observations previously reported, we observed another 456 clinician-patient interactions approximately 1 year after the intervention. Among all health care workers, there was no significant difference between hand hygiene compliance immediately postintervention (44.9%) compared with 1 year after the intervention (45.2%). Adherence among nurses, however, increased from 40.7% to 49.8% ($P = .03$), whereas adherence among doctors decreased from 50.5% to 36.5% ($P = .008$).

Conclusion: The overall effects of the intervention were sustained over a 1-year period, although a marked difference was observed between nurses and doctors.

Key Words: Handwashing; infection control; emergency medicine; health personnel.

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Health care-associated infection is one of the most important patient safety problems in the world. Many of the pathogens responsible for nosocomial infection are transmitted by the hands of health care workers¹;

therefore, the primary measure to prevent infections in hospitals is proper hand hygiene.² The goal of hand hygiene is to reduce the microbial count on the skin of health care workers to prevent cross transmission of pathogens among patients.³ Hand hygiene can be accomplished through the use of several different practices intended to decrease colonization with transient flora, including washing with soap and water or using an alcohol-based handrub.³ Given the morbidity and costs associated with health care-associated infection, international authorities strongly recommend that the hand hygiene of health care workers be improved.²⁻⁴

Despite the importance of hand hygiene, several studies have demonstrated that compliance with handwashing is low in many patient care settings,⁵⁻⁷ including the emergency department (ED).⁸ Numerous barriers to proper hand hygiene have been reported by health care workers and include skin irritation, inaccessible supplies, forgetfulness, ignorance of guidelines, insufficient time, and high workload.⁹ Certain medical specialties (eg, surgery, anesthesiology, emergency medicine, and intensive care) and certain health care workers (eg, physicians) often have higher rates of nonadherence.^{6,10}

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In a previous paper we reported the results of an observational study to assess the hand hygiene compliance rates of health care workers in 5 distinct units across 2 hospitals in Florence, Italy, including the pediatric ED of the Meyer Hospital.⁷ The compliance rate we registered in the ED was 19.2% for nurses and 7.7% for doctors. Subsequently, we conducted a multimodal interventional study in the same 5 units, observing an overall significant improvement in the rate of hand hygiene. With regard to the pediatric ED, overall hand hygiene compliance increased from 14.3% to 44.9% ($P < .001$), with a major improvement for both doctors (7.7% to 50.5%) and nurses (19.2% to 40.7%).¹¹ In this paper, we present the results of a follow-up study of hand hygiene compliance approximately 1 year after the intervention to assess the sustainability of the hand hygiene intervention in the pediatric ED of the Meyer Hospital.

METHODS

The Meyer Hospital is a pediatric hospital located in Florence, Italy, that includes a pediatric ED. The ED is organized into several emergency rooms and a short-term observation area and is staffed with a director (who is a physician), 18 pediatric doctors, 28 nurses, and 6 auxiliary staff. The ED serves the entire Florence area, with an average patient age of 6 years. In 2008, the Meyer Hospital ED had 35,079 admissions (approximately 96 per day), which were triaged using 4 color-coded priority categories. As previously reported,^{7,11} we conducted a pre-postintervention observational study in 5 units of 2 hospitals in Florence, Italy (including the Meyer Hospital ED). The goals were to (1) assess the baseline hand hygiene compliance rates of health care workers and (2) assess the effectiveness of a multimodal hand hygiene quality improvement intervention. Proper hand hygiene was defined as the use of either soap and water or alcohol-based handrub prior to patient contact.

Whereas the previous studies were conducted on 5 units, we focus this paper on the single ED unit, given the large unit-by-unit variability observed in our previous studies.^{7,11} Important differences in each unit's unique cultural and environmental characteristics can also lead to varying levels of sustainability.

The observations were conducted both in the emergency rooms and in the short-term observation area. All the health care workers were informed about the goal of the observations, and the observers were instructed not to interfere with the clinical care being delivered. The preintervention observation phase went from January 2008 to March 2008, and the immediate postintervention observation phase took place in April to June of the same year. The multimodal intervention

occurred during the first 2 weeks of April 2008 (to coincide with the date of that year's Italian elections to ensure the date was well-known to all health care workers).

The intervention was developed in collaboration with health care staff, including directors of the hospital units involved and included the following steps.¹¹ First, data on baseline hand hygiene practice rates was presented to all units to demonstrate need and gather support for making a change. Second, both physicians and nurses were educated about infection and hand hygiene via seminars and other educational sessions. The use of alcohol-based handrub as a suitable substitute for soap and water was emphasized during the educational sessions. Third, physician and nurse champions were identified on each unit to promote hand hygiene by modeling proper behavior and wearing buttons that read "Chiedimi se mi sono lavato le mani" ("Ask me if I have washed my hands"). Fourth, pocket-sized, alcohol-based handrub bottles (100 mL) were provided to all physicians and nurses. The nurse manager on each unit was responsible for keeping hand hygiene supplies stocked. Lastly, we created a "sense of urgency"¹² to prevent delay in adoption by setting the timeline for improvement on each unit to occur over weeks rather than months.

The 1-year postintervention assessment was conducted from March to June 2009 with a goal of assessing the sustainability of the hand hygiene intervention approximately 1 year later. We used the same methodology as previously described.^{7,11} The same 2 observers made the observations in the pediatric ED at all 3 time points to avoid confounding factors in the mode and subjectivity of observation. No special incentives were given to doctors or nurses over the observation period to improve their hand hygiene adherence.

All data were entered into a Microsoft Access database (Microsoft Corporation, Redmond, WA), and data analysis was performed using SAS 9.2 (SAS Institute, Cary, NC). Hand hygiene compliance rates were calculated for the entire ED as well as by clinician type. Pearson χ^2 tests were used to assess associations between compliance rates with a 2-tailed α of .05. The protocol was reviewed and approved by the hospital's ethics committee.

RESULTS

The results of the observations from all 3 time points (preintervention, immediately postintervention, and 1-year postintervention) are shown in Table 1. In the preintervention study,⁷ a total of 420 observations were conducted (239 nurses and 181 doctors). Hand hygiene prior to touching the patient was recorded in 19.2% of nurse observations and 7.7% of doctor

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