



Effect of a contact monitoring system with immediate visual feedback on hand hygiene compliance

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SUMMARY

Background: Hand hygiene compliance is traditionally monitored by visual methods that are open to bias and strictly limited in time and place. Automatic monitoring may be more effective for infection control as well as performance management.

Aim: To establish accuracy and acceptability of an automatic contact monitoring system for hand hygiene.

Methods: Monitoring equipment was installed across 55 beds in three wards, and included modified identity badges, bedside furniture, sinks and alcohol gel dispensers. Badges were in near-skin contact (through uniform) and could detect alcohol vapour. All devices were linked by wi-fi. A traffic light system on the badge provided immediate feedback to staff and patients on the hand hygiene status of a member of staff on approach to a patient. Compliance was logged automatically. Following a period of immediate feedback, no visual feedback was given for two weeks. Subsequently, feedback was given using red/green lights for 10 days, followed by retrospective feedback to the ward. Hand hygiene was verified independently by an observer.

Findings: Hand hygiene compliance increased from 21% of 97 opportunities to 66% of 197 opportunities during active immediate feedback. Compliance decreased when feedback was provided to wards retrospectively. Six staff (26%) avoided wearing a badge, saying that it was too heavy or they were not on the ward all day. Only three of 30 patients stated that they would challenge staff who had not performed hand hygiene.

Conclusions: Automatic contact monitoring with immediate feedback was effective in increasing hand hygiene compliance, but feedback given retrospectively did not prevent a decrease in compliance.

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Introduction

The prevalence of healthcare-associated infection (HCAI) is 6% in England and represents a major preventable cost.¹ Hand hygiene is central to the campaign to reduce HCAI, and

Table 1

World Health Organization (WHO) Moments of Hand Hygiene detected by the test system

WHO Moment of Hand Hygiene	Detection
1. Before patient contact	Sink trap or alcohol vapour sensors before contact with patient area sensed
2. Before aseptic task	Aseptic task not detected specifically
3. After body fluid exposure risk	Body fluid exposure not detected specifically
4. After patient contact	Sink trap or alcohol vapour sensors after contact with patient's bed/chair sensed
5. After contact with patient surroundings	Sink trap or alcohol vapour sensors after contact with patient area sensed

available evidence suggests that there is a direct link between hand hygiene and the frequency of these infections.² Encouraging compliance is the main focus of infection control within hospitals. However, poor compliance remains a common problem, especially in critical care where there are frequent contacts between staff and patients.

In 2005, the World Health Organization (WHO) undertook a major campaign to promote hand hygiene in hospitals through the use of alcohol hand gel, audit and feedback.³ Visual audit and feedback of hand hygiene compliance rates are mandatory in UK hospitals. Targets for compliance are generally very high (>90%) and are achieved according to published rates, but

there are clear differences between hand hygiene rates when the observer is obvious and when the observation is covert (30–50%).⁴ Observational methods are open to bias, the Hawthorne effect and poor reproducibility. The level of activity and distance of the observer affect the recorded level of compliance,⁵ and audit requires a member of staff to take time out of normal duties for several hours each month on each unit. The reputation of the hospital is affected by low published rates, but consistently high rates can result in declining efforts by staff to comply.⁶ In order to improve compliance, feedback should be positive, local and rapid.² Electronic monitoring has promise but has not been validated sufficiently to date.

Electronic monitoring systems have attempted to reduce the labour involved in routine audit, and to produce reproducible results at times of the day and in areas where direct observation is not practicable (e.g. single rooms and behind curtains). Education campaigns are effective in raising levels of hand hygiene compliance, but their effects are transient and they have to be repeated. Electronic systems may be able to provide continued and immediate feedback, but usually involve short-range radio frequency or ultrasonic monitors.⁴ Such systems measure proximity rather than contact, so the results are influenced by clinical staff who approach but do not touch a patient.

The Green Badge System (Veraz Ltd, Lancaster, UK) electronically detects contact between staff, patients (when in a bed or chair) and patient equipment, as well as when staff clean their hands using a handwash basin or alcohol gel. The sequence of these events demonstrates compliance with the WHO Moments of Hand Hygiene. Use of a handwash basin/alcohol gel is detected before and after contact with the patient's bed/chair and the immediate environment [Moments 1

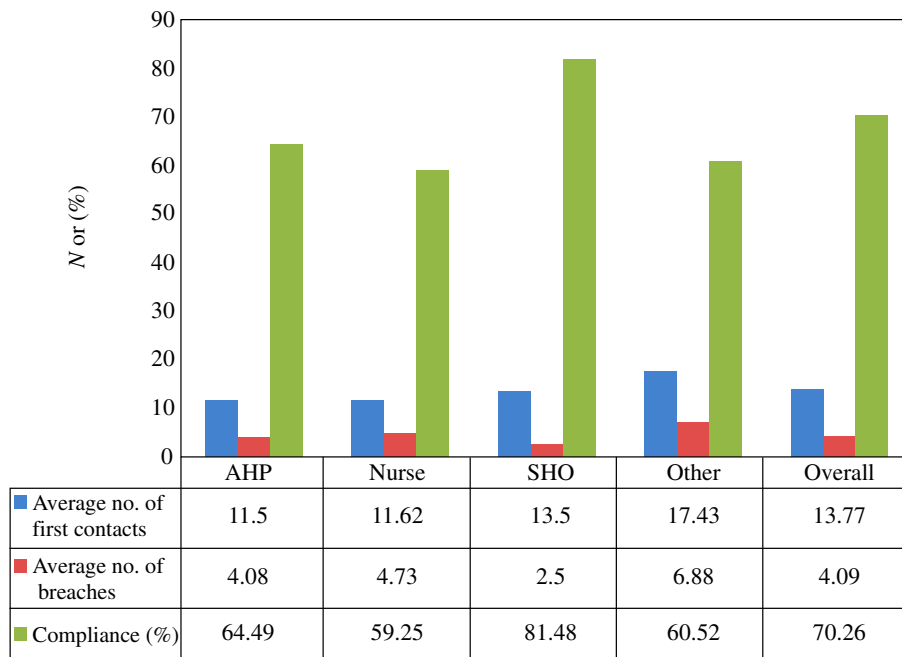


Figure 1. Monitored hand hygiene compliance by staff role. First contact, first approach by staff member in a treatment episode terminated by hand hygiene after light changed from green. Average breaches, average number of failures to observe hand hygiene before touching a patient after touching the environment or another patient. SHO, senior house officer (junior doctor); AHP, allied health professional (e.g. physiotherapist).

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