

# Hand hygiene during the intensive care unit ward round: how much is enough? An observational study

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The Australian Commission on Safety and Quality in Health Care recently launched the national program "Infection Prevention is Everybody's Business". This program aims to achieve a measurable reduction in hospital-acquired infections, and hand hygiene is seen as a key initiative.<sup>1</sup> Effective hand hygiene is considered an important tool to prevent the spread of hospital-acquired infections and reduce the transmission of antibiotic-resistant pathogens.<sup>2</sup> Intensive care units have been shown to have a high prevalence of the pathogens responsible for hospital-acquired infections, such as methicillin-resistant *Staphylococcus aureus* (MRSA).<sup>3</sup> Issues such as increased patient workloads, increasing time constraints<sup>4</sup> and multiple staff-patient contacts<sup>5</sup> have all been suggested to increase the likelihood of transmission of these pathogens within ICUs.

A recent study showed that ICU patients are contacted by health care workers (HCWs) an average of 350 times per day, with 26% of these contacts being with HCWs who have contact with multiple patients.<sup>6</sup> Another study showed an average of 15 HCW contacts per patient per hour.<sup>7</sup> Furthermore, ICU doctors are estimated to have an average of 39 direct and indirect patient contacts per day.<sup>6</sup> Effective hand hygiene is paramount for HCWs in these settings, particularly for those who contact multiple ICU patients.

The introduction of alcoholic chlorhexidine hand rubs and concomitant education and awareness programs that increase HCWs' understanding of the requirements of effective hand hygiene have been shown to increase compliance and reduce rates of hospital-acquired infections.<sup>8,9</sup> However, it has also become apparent that the traditional paradigm of undertaking hand hygiene only before and after patient review is inadequate because of the potential for intra-patient cross infection. The World Health Organization's "My five moments for hand hygiene" strategy emphasises the importance of hand hygiene between contacts with potentially contaminated sites and sterile sites in an individual patient.<sup>10</sup> For example, hand hygiene should be performed after touching external wound-drain bottles and remote patient monitors. As such, hand hygiene in the ICU requires special consideration given the frequent complexity of ward rounds. Studies have demonstrated less than desirable compliance with hand hygiene in this setting.<sup>11,12</sup>

The aim of this study was to observe directly the hand hygiene practice of an individual ICU intensivist during the

## ABSTRACT

**Introduction and objective:** Hand hygiene is the single most important measure to prevent transmission of infection, yet clinicians find it difficult to comply. We assessed the hand hygiene compliance of an individual intensivist.

**Design and setting:** Observational study at Southern Health, Melbourne, VIC.

**Main outcome measures:** Compliance with hand hygiene opportunities during four consecutive 1-hour periods (three in the intensive care unit, one during a medical ward round).

**Results:** The subject had contact with 21 patients during the 4 hours, generating 76 hand hygiene opportunities. He completed hand hygiene 33 times, an average of once every 9 minutes and a compliance of 43%.

**Conclusions:** Despite the subject's best intentions, hand hygiene was inadequate. The manner in which clinicians practise in the ICU, examine patients and conduct ward rounds needs to be reconsidered in the light of these results.

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course of the daily ICU ward round. We determined the number of patient contacts, hand hygiene opportunities and instances of completed hand hygiene for the individual intensivist.

## Methods

The study was undertaken at Dandenong Hospital, Southern Health, a 450-bed university-affiliated teaching hospital in the south-east corridor of metropolitan Melbourne, Victoria. The subject was the director of the 14-bed ICU, which includes 10 high-acuity ICU beds and four high-dependency beds. The subject was made aware of the requirements of the audit tool, knew that he was being directly observed and received performance feedback after the first hour of the audit.

The subject was observed over four consecutive 1-hour periods: three in the ICU and one during a medical ward round in his capacity as a medical consultant. Alcoholic

chlorhexidine hand rub (AHR) was available at each bedside, with sinks easily accessible in all areas.

Compliance with hand hygiene was assessed using a previously developed hand hygiene audit tool.<sup>12</sup> This tool identified opportunities for hand hygiene (defined as physical contact with patient or objects within the patient's bay) and allowed calculation of compliance by category of opportunity.

## Results

During the four observation periods, the subject had contact with 21 patients, generating 76 hand hygiene opportunities, of which 33 (43%) were successfully completed (Table 1). Hand hygiene was performed an average of once every 9 minutes. Hour 3, which corresponded to the ICU ward round, generated the most hand hygiene opportunities (35). The round involved contact with 11 different patients. In contrast, Hour 2 generated the fewest opportunities as the subject spent this hour with a single patient.

Types of hand hygiene opportunities and compliance by category of opportunity are shown in Table 2. The largest categories of hand hygiene opportunities were patient contact and contact with inanimate objects in the immediate patient environment, comprising 32 and 25 opportunities, respectively.

Use of hand hygiene products is shown in Table 3. AHR was the most frequently used product, used in 70% of all completed episodes of hand hygiene.

## Discussion

This study revealed that the subject completed hand hygiene 33 times while attending 21 patients over 4 hours. However, he missed 43 opportunities for hand hygiene. This was despite his appreciation of the importance of hand hygiene and the significant Hawthorne effect created by the presence of the study observer.

The accepted standard of hand hygiene in our ICU is for HCWs to perform hand hygiene on entering and leaving the ICU, and before and after reviewing each patient. However, the audit tool used for this study<sup>12</sup> conformed to the published guidelines of the United States Centers for Disease Control and Prevention (CDC). These guidelines highlight the requirement for hand hygiene not only before and after each patient review, but also during the examination of an individual patient.<sup>10</sup> In essence, hand hygiene should be undertaken each time the HCW moves from a potentially contaminated site at the bedside to a non-contaminated site. The CDC further defines potentially contaminated sites to include not only patient devices, such

**Table 1. Hand hygiene opportunities, by hour**

Hour	Location	Patients contacted	Hand hygiene opportunities	
			No. completed	Total generated
1	ICU	3	3	17
2	ICU	1	7	8
3	ICU	11	17	35
4	Medical round	6	6	16
Total		21	33	76

**Table 2. Hand hygiene compliance, by category of opportunity**

Activity	Hand hygiene opportunities		
	Completed	Total	Compliance
Patient contact	10	32	31%
Inanimate object contact	15	25	60%
ICU chart contact	4	13	31%
Intravenous access	3	4	75%
Wound contact	1	2	50%

**Table 3. Use of hand hygiene products**

Product	Total times used	Percentage of all hand hygiene
Alcoholic chlorhexidine rub*	23	70%
2% chlorhexidine soap	6	18%
Non-medicated soap	4	12%

\* 70% alcohol, 0.5% chlorhexidine.

as drains, drips and catheters, but also the associated medical equipment in the immediate vicinity of the patient, including the bedside chart.

During this audit, the ICU director was made aware of the requirements of the audit tool, knew that he was being directly observed and received performance feedback after the first hour of the audit. From the human factors' perspective, he put considerable effort into complying with the hand hygiene guidelines, as evidenced by the fact that he completed hand hygiene on 33 occasions during the 4-hour observation period (that is, an average of at least once every 9 minutes). However, compliance with hand hygiene was affected by the competing demands and "chaos" of the ICU ward round, with the need to appropriately assess patients and communicate effectively with a multidisciplinary

nary team, while being repeatedly interrupted by, for example, urgent phone calls.

The CDC guidelines as cited by Pittet et al<sup>8</sup> indicate that, for 100% compliance with hand hygiene, significant behavioural and organisational changes will be needed during the ICU ward round. Despite best intentions, the round is often complicated. Obtaining the relevant patient data for day-to-day management at the bedside is a complex process that includes examination of the patient, checking of equipment settings, review of laboratory and radiology results, and discussion between all relevant team members. In addition, there are often interruptions and urgent phone calls. As identified in this study, the process at the bedside involves potential cross contamination by hand contact from contaminated sites to sterile sites.

The ward round could be redesigned in a number of ways to reduce the need for hand hygiene and thereby increase compliance. Firstly, a substantial amount of patient data could be retrieved, analysed and documented in the medical record remote from the bedside. Secondly, the number of participants in the bedside ward round should be minimised. There is no reason that the bedside physical examination of the patient could not be performed by the responsible registrar, consultant and bedside nurse alone. A remote forum could then manage much of the patient's other multidisciplinary requirements, as well as provide education. Finally, at each bedside, potentially contaminated sites need to be clearly delineated from sterile sites.

## Conclusions

This study found that, despite significant effort, compliance with hand hygiene requirements in our ICU is inadequate. These results suggest the need to reconsider how we practise to maximise patient outcomes.

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