

# Improving hand hygiene adherence through an intervention bundle that includes an electronic monitoring system that provides real-time personal feedback to staff

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## Introduction

Hand hygiene is considered the simplest way to prevent the spread of pathogens that can cause healthcare associated infections (HCAIs). The CDC and WHO and industry experts in infection control and epidemiology (SHEA/IDSA) advocate strongly for frequent hand hygiene as a standard precaution in preventing HCAIs. Yet across multiple studies using direct observation, mean hand hygiene adherence was 38.7%. Accurately measuring hand hygiene adherence through observation has proven to be challenging.

A review of intervention bundles that have been successful in improving hand hygiene adherence found these factors in common:

- Sustained improvements in hand hygiene rates over time and reduction in measured infection rates.
- Real change took a long time.
- They fully engaged people from frontline staff to senior leadership.
- Were respectful and non-punitive to everyone involved.
- Transferred ownership for hand hygiene compliance from Infection Prevention to the clinical staff, thus changing the culture.
- Provided feedback which was timely, non-punitive, individualized, and customizable.

The availability of electronic systems to monitor hand hygiene adherence has generated interest in evaluating these systems to measure more accurately than visual observation. The system is able to measure more of the hand hygiene events and moments than captured by observation, and provide direct feedback.

## Objectives

This process surveillance study used an intervention bundle that included an electronic hand hygiene monitoring system (HanGenix, Atlanta USA) that provided personal real-time feedback through notifications at the point of care to help the staff improve their hand hygiene adherence.



## Methods

This study was performed in a 35 bed cardiac unit of a 525 bed hospital in Dordrecht, Netherlands which includes single patient rooms, 2 patient rooms, and 4 patient rooms. It was implemented in three phases; baseline (7 days), bundle introduction (3 days) and post-intervention (7 days).

The bundle included enhanced access to through installation of 8 new hand hygiene dispensers, administrative support (through in-hospital promotion and local media), a multi-modal program for hand hygiene as described elsewhere<sup>1</sup>, the WHO 5 Moments model for hand hygiene, staff training and education, measurement of hand hygiene adherence via an electronic monitoring system and by direct observation, and personal feedback to staff via the electronic system.

The electronic monitoring system (figure 1) includes monitors placed over the patient bed to create a protection zone that overlaps the patient zone, monitors on the hand hygiene dispensers to indicate when hand hygiene is being performed, and a personal badge. The badge is the brain of the system, recording entry into patient zones (protection zones), when use of hand hygiene products occurs, and providing notifications (a series of beeps) to notify a worker when they are expected to perform hand hygiene.



Figure 1. Set up electronic hand hygiene monitoring system

## Results

As shown in Table 1, there were 11,075 opportunities and 5,253 hand hygiene events counted during the study period (47.4% overall adherence.) Hand hygiene adherence was 37.9% during baseline (1,793 events/4,732 opportunities) and 54.5% during the intervention period (3,460 events/6,343 opportunities), a 43.8% improvement.

As has been reported in other studies, zone exit compliance was higher than zone entry compliance. During the intervention period zone entry compliance was 45.2%, while zone exit compliance was 61.7%. 82% of hand hygiene events were performed with alcohol gel and 18% with hand soap/hand washing.

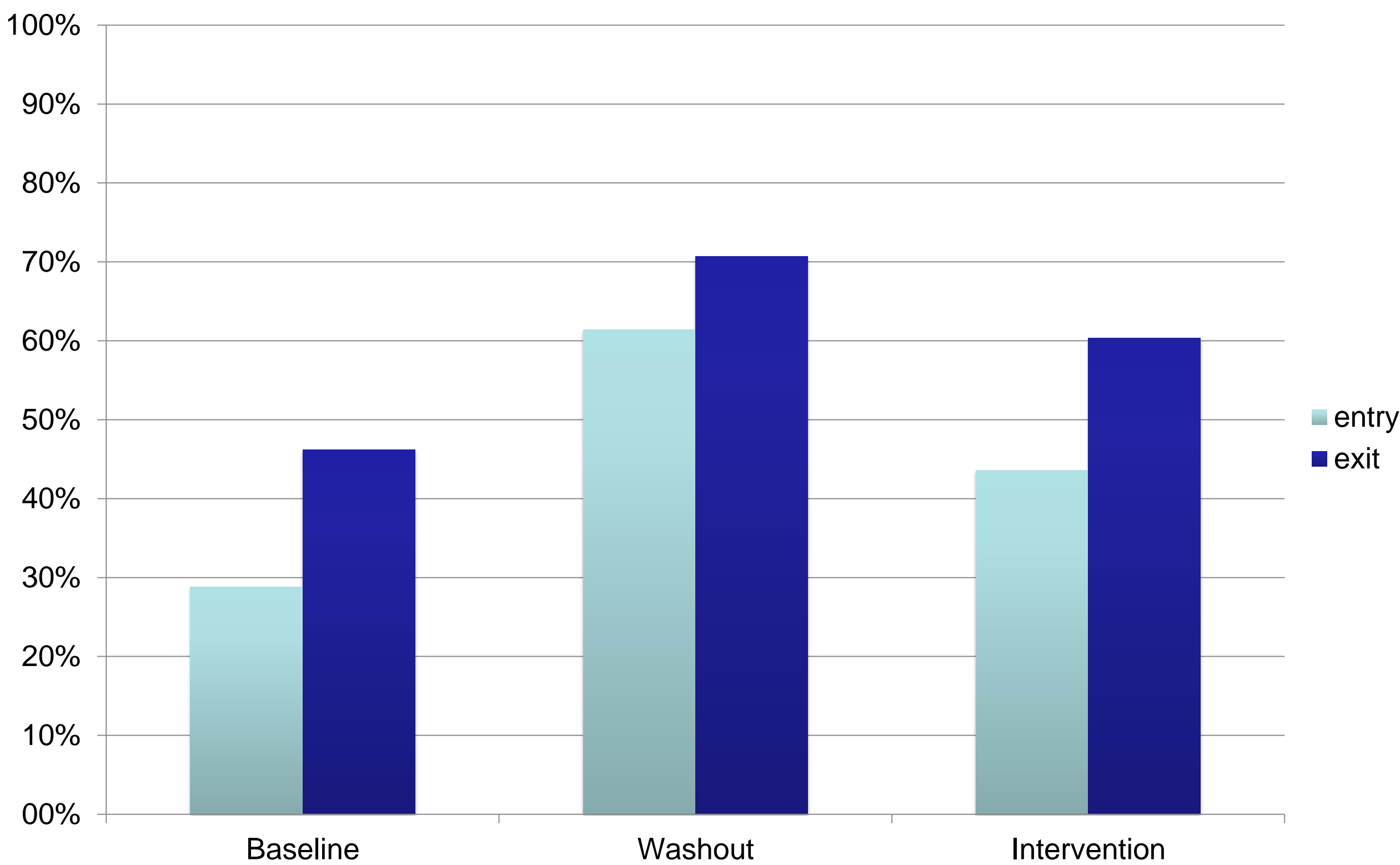


Figure 2. Handhygiene compliance at entry and exit of patient room

Study Phase	Events/Opportunities	Hand hygiene Adherence (%)
Baseline	1,793 of 4,732	37.9%
Intervention	3,460 of 6,343	54.5%
Overall Compliance	5,253 of 11,075	47.4%
Improvement from Baseline	N/A	43.8%

Table 1. Overall results hand hygiene trial

## Conclusions

The results of this study are consistent with many of the things reported previously in the literature. The use of an intervention bundle with elements previously validated resulted in a significant improvement in hand hygiene adherence. A significant improvement in hand hygiene was achieved despite the short study period. Zone exit compliance was significantly higher than zone entry compliance.

While the elements of the intervention bundle have been evaluated previously, the introduction of the personal feedback via the electronic monitoring system seems to have had a significant effect on the hand hygiene adherence rates. This study shows that electronic hand hygiene compliance monitoring systems can help significantly influence hand hygiene adherence rates. Further work is needed to determine whether the increase in adherence can be sustained and whether the level of improvement can be increased over a longer time period.