

# Culture change for hand hygiene: *Clean hands save lives*, Part II

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In 1996, when the hand hygiene behaviour of medical staff in an Australian teaching hospital was documented, hand-washing both before and after patient contact was performed only once in every three contacts.<sup>1</sup> Studies conducted in Australian hospitals have shown that hand hygiene compliance differs significantly across specialties<sup>2-5</sup> and between before- and after-patient contacts.<sup>3,4,6</sup> The location of sinks<sup>2</sup> and time constraints<sup>4</sup> are not predictors of compliance, but a strong predictor is the perception by staff that their peers expect them to comply.<sup>4</sup>

In 2006, the Clinical Excellence Commission (CEC), on behalf of the New South Wales Department of Health (NSW Health), developed and implemented the *Clean hands save lives* campaign across all public hospitals in NSW. A comparison of studies evaluating hand hygiene compliance in a variety of settings demonstrates that there was a lack of standard practice in Australia before the NSW campaign. Generally, compliance rates in studies conducted in three states (Queensland, NSW and Victoria) rarely exceeded 50% (ie, one hand hygiene event for every two patient contacts). In a study conducted across four wards in a Queensland teaching hospital, average compliance rates were 30% (range, 13%–47%) before patient contact and 44% (range, 23%–72%) after patient contact.<sup>2</sup> A study of nursing staff from a Sydney teaching hospital reported even lower average compliance rates of 15% before patient contact and 30% after patient contact.<sup>3</sup> Compliance rates were similar in study of a Victorian teaching hospital, with an average of 21% (range, 10%–44%) for aggregated pre- and post-contact compliance across five clinical areas prior to an intervention.<sup>5</sup> A hand hygiene culture-change program in Victoria began as a pilot in six hospitals and was then rolled out statewide to 75 Victorian hospitals.<sup>6</sup> In the pilot study, average compliance rose significantly, from 21% at baseline to 47% (range, 31%–75%) 24 months after the intervention. In the statewide roll-out, average compliance rose from 20% (range, 10%–44%) at baseline to 53% (range, 26%–83%) after 12 months.<sup>6</sup>

Hand hygiene habits and the lack of compliance with this basic infection control measure are complex behavioural issues and a subject of contentiousness within the

## ABSTRACT

**Objective:** To present the results of surveys of staff, patients and visitors about their perceptions of hand hygiene behaviour before and after implementation of the *Clean hands save lives* campaign in New South Wales public hospitals.

**Design and setting:** Pre- and post-campaign questionnaires, disseminated through project officers in each health authority, were completed by selected staff and patients/visitors in all 208 public hospitals in NSW. Combined, de-identified results for each health authority were forwarded to the NSW Clinical Excellence Commission for analysis.

**Main outcome measures:** Awareness of campaign material; staff perceptions about their ability to maintain a high level of hand hygiene compliance before and after contact with patients; compliance self-reported by staff compared with compliance perceived by patients/visitors and compliance assessed by overt observation.

**Results:** Most staff and patients/visitors were aware of campaign materials. Eighty-six per cent of staff respondents (495/578) believed that placement of alcohol-based hand rub (AHR) close to the point of patient care had improved hand hygiene compliance, and 76% (510/671) believed they could sustain their level of compliance. Only 1 in 4 patients or visitors (106/397) were willing to question health care workers who appeared not to be complying with hand hygiene practices.

**Conclusion:** As the first coordinated statewide campaign to modify hand hygiene culture, the *Clean hands save lives* campaign successfully engendered positive attitudes and dispelled negative perceptions about the onerous nature of before- and after-patient-contact hand hygiene compliance.

MJA 2009; 191: S13–S17

health care industry. Numerous factors influencing hand hygiene compliance have been hypothesised, including time constraints, peer behaviour and peer expectations (Box 1).

Decades after the emergence of methicillin-resistant *Staphylococcus aureus*, the struggle continues to change the hand hygiene behaviour of health care workers (HCWs) from a focus on self-protective behaviour<sup>4</sup> to a focus on protecting the patient. Given the numerous infection control advances since the discovery of antibiotics, the persistence of suboptimal hand hygiene rates globally could suggest that infection control has “taken its finger off the pulse” of basic practices. However, perennially low hand hygiene compliance is not simply the result of failure to implement infection control measures. Changing entrenched behaviour also involves challenging organisational culture — behaviour, values, and “the way we do things around here”.

The results and implementation of the *Clean hands save lives* campaign in NSW are reported in detail elsewhere.<sup>12-14</sup> We report here on surveys of staff, patients and visitors about their perceptions of hand hygiene

behaviour during the pre- and post-campaign periods. Awareness of and attitudes to the campaign material were measured to gauge the success of the introductory systematisation of a culture change towards better hand hygiene.

## METHODS

An earlier survey of hand hygiene practices conducted by the CEC in 2005 across a variety of hospitals in all NSW area health services (AHSs) had identified activities and strategies employed locally to improve hand hygiene (unpublished data). This information was used to assist in developing strategies for implementing the *Clean hands save lives* campaign. The primary aim of the campaign was to systematise hand hygiene practices with the introduction of alcohol-based hand rub (AHR) in all NSW public hospitals. Secondary goals were to increase hand hygiene compliance by HCWs and reduce health care-associated infections. Drawing on lessons learned from the 2005 pre-campaign survey, the international literature on the subject and the successful *cleanyourhands* campaign in the United

**1 Barriers to hand hygiene compliance<sup>3,5,7-12</sup>**

**Staff personal issues**

- High workload and understaffing
- Insufficient time
- Ignorance of guidelines
- Negative influence of colleagues on hand hygiene compliance
- Perceived lack of scientific information demonstrating the impact of improved hand hygiene on hospital infection rates
- Skin irritation or sensitivity
- Interference with worker–patient relationship
- Patient needs perceived as a priority

**Staff behaviour issues**

- Forgetfulness
- Low priority by some health care workers
- Wearing gloves — perception that this negates the need for hand hygiene
- Lack of motivation — lack of educational resources, guidelines and protocols
- Translation of behaviour learned and practised in the community ♦

Kingdom,<sup>15</sup> the NSW campaign included four main strategies (Box 2).

**Staff and patient/visitor surveys**

Achievement in each of the four campaign strategy areas was measured using standardised questionnaires based on those used in the *cleanyourhands* campaign.<sup>15</sup> The surveys were conducted before the *Clean hands save lives* campaign (in February 2006) and repeated after the campaign (in February 2007). Pre- and post-campaign surveys of staff contained four self-reported behaviour items, three patient involvement items, four staff demographic items, and one campaign awareness item, with an additional four items in the post-campaign survey relating to poster materials. Pre- and post-campaign surveys of patients and visitors contained three items on campaign awareness, four items on patient willingness to engage in the campaign, and one item on perception of

staff hand hygiene compliance before and after patient contact.

In both staff and patient/visitor surveys, perception items were measured using a four-point scale (“always”, “sometimes”, “rarely” or “never”), but, because of infrequent responses, the last two categories (rarely and never) were aggregated for analysis. A yes/no scale was used for responses measuring knowledge of the availability of AHR, clinical leadership and the wearing of a hand hygiene badge. A four-point scale (always, sometimes, rarely or never) was used by staff, patients and visitors to measure the frequency of requests to wash hands. Four open-ended items in staff surveys measured opinions about necessity, practicality, effectiveness and the likelihood of maintaining behaviour. Responses to these were later divided into two categories: “negative” responses (which also included non-committal comments) and “positive” responses. Most items included an opportunity for comments.

As the responses to some survey items were incomplete, there was considerable variation in the denominators used to calculate percentages.

**Health care facility categories**

Facilities were divided into peer groups based on a classification adopted by the Australian Council on Healthcare Standards and used for the NSW Health Infection Control Program quality monitoring indicators.<sup>16</sup> Hospitals were instructed on survey sampling according to type of facility:

- Group 1 (major teaching or referral hospitals). Ten staff surveys and five patient/visitor surveys were conducted in each of three wards in each data collection period. Eight hospitals were surveyed (including staff, but not patients or visitors, from the Children’s Hospital at Westmead).

- Group 2 (district hospitals). Three staff surveys and five patient/visitor surveys were conducted in each of three wards in each data collection period. Eight hospitals were surveyed.

- Group 3 (community-based hospitals). Three staff surveys and three patient/visitor surveys were conducted in each of two wards in each data collection period. Eight hospitals were surveyed.

- Justice Health. In each data collection period, staff surveys were conducted in each of three wards or clinics having five or more staff. Justice Health determined that patient surveys were not appropriate.

- The Ambulance Service of NSW. In each data collection period, staff surveys were conducted in 12 services from three divisions having four or more staff. The Ambulance Service determined that, because of the emergency status of patients, patient surveys would not be conducted.

The minimum sample size expected from both pre- and post-campaign survey periods was 390 staff surveys and 288 patient/visitor surveys from the 11 health authorities in NSW (eight AHSs, the Children’s Hospital at Westmead, the Ambulance Service of NSW and Justice Health).

**Data collection and analysis**

Nominated coordinators at individual facilities collected completed surveys and submitted them (after removing any hospital- or staff-identifying information) to AHS project officers. Combined results for each AHS were forwarded to the CEC for collation and analysis. EpiInfo software, version 6.04d (Centers for Disease Control and Prevention, Atlanta, Ga, USA) was used to calculate 95% confidence intervals for proportions. As not all items in the surveys were completed, item-specific denominators were used to calculate percentages and are shown here in the results. Qualitative data were examined for themes.

**Ethics approval**

Ethics approval was not required for evaluation of the intervention, as data collection for the *Clean hands save lives* campaign was considered a quality assurance activity.

**RESULTS**

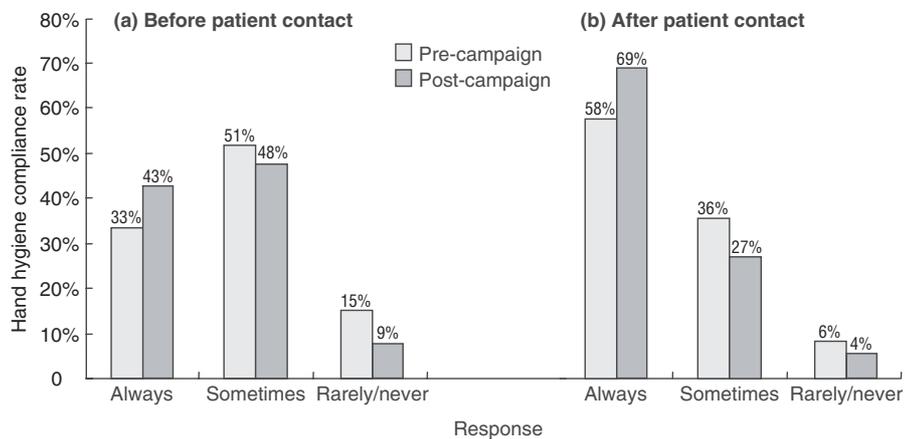
**Staff surveys**

A pre-determined minimum of 780 surveys in total (sufficient to allow a change in attitudes and behaviour to be established) were

**2 Campaign strategies**

- Provision of alcohol-based hand rub at point of patient care
- Appointment of staff champions and project leaders
- Involvement of patients, carers and visitors in the hand hygiene aspect of their care
- Promotion of collateral material to market the campaign and maintain the interest of target groups in the campaign messages:
  - Talking walls — staff posters changed every month
  - Hand hygiene technique poster
  - Patient/visitor targeted posters
  - Patient/visitor brochures (translated into 22 languages)
  - “Teaser” stickers
  - “It’s OK to ask” badges
  - T-shirts with campaign logo
  - Balloons with campaign logo ♦

**3 Staff self-reported levels of hand hygiene compliance before and after contact with patients**



	Hand hygiene compliance rate % (95% CI) [n/N]		
	Always	Sometimes	Rarely/never
<b>Before patient contact</b>			
Pre-campaign (Feb 2006)	33 (31–36) [413/1242]	51 (49–54) [639/1242]	15 (13–17) [190/1242]
Post-campaign (Feb 2007)	43 (39–47) [242/563]	48 (43–52) [268/563]	9 (7–12) [53/563]
<b>After patient contact</b>			
Pre-campaign (Feb 2006)	58 (55–61) [719/1240]	36 (33–38) [441/1240]	6 (5–8) [80/1240]
Post-campaign (Feb 2007)	69 (65–73) [422/612]	27 (23–31) [165/612]	4 (3–6) [25/612]

distributed by hospitals to a selection of wards during both collection periods. However, hospitals could choose to survey more than the minimum sample, and the number of surveys actually received was 1458 (pre-campaign) and 671 (post-campaign).

Nursing staff contributed the largest proportion of responses in both pre- and post-campaign survey periods (78% [908/1168] and 76% [429/568], respectively), followed by medical staff (12% [140/1168] and 7% [42/568]), allied health staff (5% [57/1168] and 8% [44/568]) and other staff (5% [63/1168] and 10% [55/568]). This order of respondents by professional groupings was similar in both the pre- and post-campaign surveys ( $P = 0.118$ ;  $z = 1.563$ ).

Two-thirds of the staff surveyed had over 5 years' experience in their profession, and almost all reported that they were working in their usual ward during both survey periods.

**Patient/visitor surveys**

Although a minimum of 288 surveys were required from patients or visitors, there were actually 576 received for the pre-campaign

period and 515 for the post-campaign period. Of these, 60% (655/1091) were completed by patients and 40% (436/1091) by visitors.

**Clean hands save lives campaign posters**

When interviewed after the campaign, 93% of staff (621/668) reported reading at least one of the 12 staff-targeted campaign posters, and 78% of a subset of those staff (237/305) were able to recall verbatim at least one key campaign message, including "Get with the program. Clean hands save lives" (29% [69/237]); "It's OK to ask" (16% [39/237]); and "Please clean your hands" (11% [26/237]). The remaining 22% of staff (68/305) could cite in general terms other hand hygiene messages.

Of patient/visitor respondents, 64% (124/193) recalled verbatim at least one message from either a staff- or patient/visitor-targeted poster. Of those who recalled any poster, 14% (18/124) remembered at least one of the three patient/visitor-targeted posters. Twenty-five per cent of patient/visitor

respondents (130/514) recalled receiving the patient/visitor information brochure, "What you need to know about hand hygiene".

**Staff perception of hand hygiene compliance**

In post-campaign surveys, 27% of staff (162/596) reported that campaign posters had changed their own hand hygiene compliance before patient contact and 30% (181/596) said that posters had changed their compliance after patient contact. Twenty per cent of staff (118/596) claimed the posters had contributed to their understanding of the need to clean hands more frequently, and 10% of respondents (59/596) said the posters helped them clean their hands more frequently both before and after patient contact, as well as increasing their understanding of why hands need to be cleaned more frequently.

Eighty-six per cent of staff (495/578) believed that placing AHR in the wards close to the point of patient care had helped them improve the frequency of cleaning their hands.

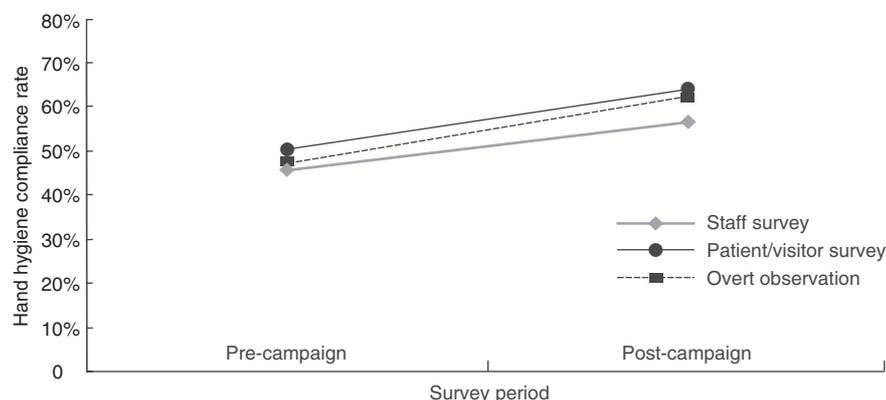
Thirty-three per cent of staff (413/1242) in the pre-campaign period and 43% (242/563) in the post-campaign period rated themselves as always complying with hand hygiene practice before patient contact (Box 3). The corresponding proportions for after-patient contact were 58% (719/1240) in the pre-campaign period and 69% (422/612) in the post-campaign period (Box 3).

In pre-campaign surveys, an average of 46% of staff (413/1242 before patient contact and 719/1240 after patient contact) rated themselves as always complying with hand hygiene practice in all patient contacts, while patients/visitors perceived staff as always complying 50% of the time (275/545) (Box 4). This compares with 47% overall compliance determined by overt observation of staff (details reported elsewhere).<sup>13</sup> By the post-campaign period, rates of hand hygiene compliance had risen to an average of 57% reported by staff (242/563 before patient contact and 422/612 after patient contact), 64% (234/367) perceived by patients/visitors and 62% recorded by overt observation.<sup>13</sup>

**Staff perceptions and attitudes**

Prior to the campaign, 89% of staff (710/795) believed that cleaning hands before and after patient contact was necessary, but 38% (280/735) thought the requirements

**4 Relationship between self-reported hand hygiene compliance by HCWs, patient/visitor perceptions of hand hygiene compliance by HCWs, and observed hand hygiene compliance**



	Staff surveys*	Patient/visitor surveys	Overt observations <sup>13</sup>
Pre-campaign (Feb 2006)	46 (44–46) [1132/2482]	50 (46–55) [275/545]	47 (46–48) [3795/8057]
Post-campaign (Feb 2007)	57 (54–59) [664/1175]	64 (59–69) [234/367]	62 (61–63) [5118/8225]

HCW = health care worker. \* Numerators and denominators reflect aggregated data for hand hygiene compliance before and after patient contact.

were impractical. Post-campaign surveys showed that these proportions had not changed significantly (*P* values are for pre-versus post-campaign comparisons): 92% (315/344) (*P* = 0.149;  $\chi^2$  = 2.08) and 33% (106/325) (*P* = 0.116;  $\chi^2$  = 2.47), respectively. The belief that cleaning hands both before and after patient contact was “effective in reducing transmission of infectious agents” increased significantly, from 61% (416/682) before the campaign to 91% (265/291) after the campaign (*P* < 0.001;  $\chi^2$  = 87.80).

Before the campaign, the average observed hand hygiene compliance rate was 47%,<sup>13</sup> and 76% of staff (510/671) perceived that they were likely to maintain their current hand hygiene rate. After the campaign, the observed compliance rate was 62%<sup>13</sup> (in February 2007, the observation period closest to the survey dates), and 90% of staff (265/296) (*P* < 0.001;  $\chi^2$  = 28.07) believed they could maintain their new compliance rate.

Staff believed their new hand hygiene behaviour was easier to maintain. Typical comments included the following:

- It becomes routine, habit.
- [It] is ingrained behaviour.
- [It's] easier to maintain hand rub than hand-washing.

**Patient involvement**

Most patients and visitors surveyed expressed a desire to be involved in helping staff to improve their compliance (78% [424/547] before the campaign v 79% [300/380] after the campaign; *P* = 0.441;  $\chi^2$  = 0.59). However, the proportion of patients/visitors who made at least one enquiry to staff about their hand hygiene practices did not change (49% [268/552] before the campaign v 48% [187/386] after the campaign; *P* = 0.761;  $\chi^2$  = 0.09). Before the campaign, 15% of patients/visitors (85/552) said they were willing to “inform someone in charge”, but 28% (157/552) said they would “do nothing” about staff breaches of hand hygiene protocol. By the post-campaign survey, 27% of patients/visitors (106/397) were willing to remind staff about hand hygiene, but 24% (92/386) said they would still do nothing about breaches of protocol. In spite of this, staff perceived an increase in enquiries from patients and visitors about their hand hygiene practices (from 42% [608/1456] before the campaign to 62% [392/629] after the campaign).

Patients and visitors believed that hand hygiene should be an everyday practice when caring for patients. The following quotes illustrate some of the opinions expressed:

Hand hygiene should be part of their job, no questions asked.

As health professionals, it is their responsibility to [comply with] hand hygiene [protocol].

Hand hygiene should be the usual [practice], to wash before doing anything with a patient.

I would assume it would be common practice for staff to be hygienic and wash their hands.

It should come naturally.

Patients and visitors believed that asking staff about their hand hygiene would produce positive results. For example:

[It would] ensure that cross infection doesn't occur, especially to my mum.

Yet patients and visitors expressed discomfort when asked if they would make a direct enquiry to staff about their hand hygiene practices:

Patients feel too unwell to watch staff.

I would not want to confront anyone.

[Asking staff to comply with hand hygiene protocol] could upset them.

[I would be] too embarrassed to say — [asking is] rude.

**DISCUSSION**

The principal finding of our study was that the *Clean hands save lives* campaign successfully challenged existing hand hygiene practices and initiated positive changes in the understanding, values and behaviour of staff, patients and hospital visitors. The first step in initiating a new way of doing things<sup>17</sup> is to effect acceptance and ownership of the practice.<sup>18</sup>

We witnessed an increase in staff acceptance of the necessity for hand hygiene compliance and its effectiveness as an integral component of strategies to reduce infection by multiresistant organisms. We believe the concurrence between staff self-reported hand hygiene behaviour, hand hygiene behaviour observed by patients/visitors and overt observational audits of hand hygiene practices validates our conclusion. Survey response rates exceeded minimum sample sizes expected for each survey period, and we believe this indicates a strong level of engagement by the health services involved.

The campaign was directed at staff as well as patients and visitors. This motivated and influenced staff to improve their hand hygiene practices and also increased their confidence in being able to sustain the higher compliance levels achieved.

Although there was an increase in patient/visitor awareness of the *Clean hands save lives* campaign and in their communication with staff about hand hygiene, the "It's OK to ask" component of the campaign was of limited success. As patients tended to feel vulnerable during their hospital stay, the expectation that they would actively participate in the campaign may have been premature.

Other studies and campaigns examining the impact of AHR have shown an increase in staff compliance rates after the introduction of AHR.<sup>15,19</sup> Before the placement of AHR in NSW hospitals, staff reported that the most challenging aspect of increasing the frequency of hand cleaning was the practicality of performing the task. By maintaining the availability of AHR and emphasising organisational involvement, the *Clean hands save lives* campaign focused on enabling staff to view hand hygiene as the healthy, safe and easy choice. Ease of access to AHR may be one factor contributing to the improvement in hand hygiene compliance, but the practice of cleaning hands before and after every patient contact was still questioned. Although staff reported they were committed to sustaining behavioural change, this commitment would be difficult without ongoing organisational support.<sup>14</sup> This support would need to include a commitment to provide AHR at the point of patient care, timely data on infection rates, and direct and regular feedback on hand hygiene practices. Clinicians would also benefit from ongoing timely feedback on their compliance and from patients/visitor enquiries about their hand hygiene behaviour.

Did our campaign improve hand hygiene culture? Yes, we believe we have begun to shift the culture of hand hygiene. But we have only just begun! The next step in sustaining this culture change is to ensure that staff and patients are always given the information they need to measure compliance and outcomes. We need to explore ways to strengthen the willingness of staff to respectfully enquire about each other's hand hygiene compliance and to improve the engagement of patients and visitors in this aspect of health care. Such culture change, combined with a strong sense of individual accountability, will strengthen patients' trust in the health care system.

## ACKNOWLEDGEMENTS

Our project was a joint initiative of the CEC and NSW Health.

## COMPETING INTERESTS

Mary-Louise McLaws has joined the WHO First Global Patient Safety Challenge pilot country project to provide epidemiological advice. Clifford Hughes operates the Australia and New Zealand Heart Valve Registry, which tracks patients with a Björk-Shiley convexo/concave heart valve. He distributes guidelines to these patients through their doctors as developed by the medical supervisory panel of the Bowling-Pfizer Heart Valve Settlement. He is the Principal Investigator of the On-X Heart Valve Study in Australia, for which Onyx Life Technologies pays the expenses. He has received funding from Roche Diagnostics for travel expenses to attend meetings.

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(Received 13 May 2009, accepted 17 Aug 2009) □