

A statewide approach to systematising hand hygiene behaviour in hospitals: *Clean hands save lives, Part I*

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The link between poor hand hygiene of health care workers (HCWs) and the spread of infection in hospitals has been known and widely promulgated for the past 150 years,^{1,2} and a causal link between good hand hygiene and reduced risk of nosocomial infection has been demonstrated.³ Yet multiple studies have documented the poor compliance of HCWs with hand hygiene practices.⁴ With increasing rates of infection and morbidity associated with multiresistant organisms (MROs) in hospitals, hand hygiene has become a key patient safety issue worldwide.^{5,6} In 2005, the World Health Organization launched the first Global Patient Safety Challenge, *Clean care is safer care*,⁶ and Australia pledged its commitment to the cause the following year.⁷ The Clinical Excellence Commission (CEC), established in 2004 by the New South Wales Minister for Health, implemented a statewide campaign in 2005 to make hand hygiene a top priority in all public hospitals in NSW. The CEC saw the issue of hand hygiene to be closely aligned with its mission to build confidence in the NSW health care system by making it demonstrably better and safer for patients and a more rewarding workplace for staff.⁸

An earlier survey of hand hygiene activities conducted by the CEC in 2005 received responses from 62 hospitals, representing all geographical area health services (AHSs), the Children's Hospital at Westmead and Justice Health. Forty-five of the 62 responses were from rural hospitals. Activities undertaken in most of the AHSs before the campaign described here had centred on raising awareness of the need for hand hygiene through education and training and the use of posters, rather than through a comprehensive multimodal program that measured compliance and gave feedback to staff.

Compliance with hand hygiene guidelines is a remarkably complex issue that relies on a

ABSTRACT

Objective: To describe the planning and execution of a statewide campaign aimed at improving compliance with hand hygiene practices in New South Wales public hospitals.

Design and setting: The campaign was conducted in all area health services (AHSs) in NSW (covering 208 public hospitals) between February 2006 and February 2007. Clinical practice improvement methods and campaign strategies were used to improve the availability and use of alcohol-based hand rub (AHR) at the point of patient care, using staff champions and local leaders, engaging patients and families, and measuring compliance. Staff were given regular feedback on their performance. Project officers funded by the Clinical Excellence Commission (CEC) provided local project management support and implemented the campaign in a standardised format orchestrated by the CEC.

Main outcome measures: Proportion of available beds with secured and unsecured AHR containers nearby; amount of AHR used (based on purchasing patterns).

Results: Hospital visits before the campaign identified a lack of appropriately placed AHR at the point of care. The number of AHR containers per available bed in near-patient locations increased to 13 280/18 951 (70%) after the campaign. The quantity of AHR purchased per month across NSW public hospitals increased from 1477 L to 5568 L (a 377% increase).

Conclusion: The CEC was successful in systematising the placement of AHR in all NSW public hospitals at the point of patient care. Although the use of AHR increased substantially, some staff were resistant to changing their hand hygiene practices.

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combination of education and training and is influenced by deeply held personal beliefs and the behaviour of peers and superiors.^{9,10} A number of studies have described efforts to improve hand hygiene, with most citing "success rates" of compliance of no more than 61%, and fewer sustaining the improvement beyond the life of the initial intervention phase.^{4,11-13}

In 1997, Larson and colleagues described the implementation of a multifaceted approach to changing hand-washing behaviour.¹⁴ Pittet's 2001 model from the Infection Control Program of the University of Geneva hospitals demonstrated the value of clinical champions, a "talking walls" poster campaign, and a system of monitoring adherence to hand hygiene practices involving feedback to staff on their performance.⁴ The CEC-led campaign described here borrowed from the successes of these two models and other initiatives, including the *cleanyourhands* campaign of the National Health Service in the United Kingdom,^{4,7,15,16} to implement a statewide multifaceted approach to incorporating hand hygiene into everyday clinician behaviour. We describe the planning and execution of this campaign.

METHODS

Design

A detailed description of the planning phase of the project is documented elsewhere.¹⁷ Campaign methods and standardised audits were used to maximise the reach of the campaign in a systematised manner to all HCWs across the state. Clinical practice improvement techniques were used, based on the historical work by Deming in the 1950s for process improvements in industry and adapted for experienced medical and nursing clinicians.¹⁸ The project had the support and approval of the NSW Department of Health (NSW Health).

Setting and sample

The public hospital system in NSW employs more than 108 000 staff, the majority of them in clinical roles. These clinicians work in 208 hospitals that range in size and function from small multipurpose services in rural and remote areas to large urban teaching hospitals. The hospitals come under 11 health authorities: eight geographically defined AHSs, the Children's Hospital at Westmead, and two statutory health authorities (the

Abbreviations

AHR	Alcohol-based hand rub
AHS	Area health service
CEC	Clinical Excellence Commission
HCW	Health care worker
MRO	Multiresistant organism

1 "Clean hands save lives" logo

Clean hands save lives



Ambulance Service of NSW and Justice Health). Each authority received funding from the CEC to employ a project officer to implement the campaign strategies in their organisation. The campaign was run over a 12-month period from February 2006 to February 2007.

Integral to all change management programs is identifying organisational support to implement the change and help develop an understanding of the current climate in which the change is to be made.¹⁹ The available NSW data on MRO infections were examined, and a pre-intervention survey was administered to all authorities via their network of infection control professionals to assess the current level of activity on hand hygiene.

To help engage the wider community in the campaign, a high-profile media launch involving the NSW Minister for Health, the Hon John Hatzistergos, was undertaken. Similar local launches with chief executives of the AHSs were conducted across the state.

Project objectives

The principal objectives of the project were:

1. To ensure that alcohol-based hand rub is available at the point of patient care

Preparatory work was undertaken to ensure that the specifications for a tender process for purchasing alcohol-based hand rub (AHR) products on statewide contract included (a) supply of brackets to fix AHR containers in near-patient locations; (b) practical assistance for hospitals in fixing brackets to walls; and (c) supply and distribution of products to ward areas. The CEC engaged local hospital management through senior executive sponsorship to ensure that the purchase of AHR and installation of brackets by hospital maintenance departments was given priority. This was achieved through presentations to the executive management teams during their regular meetings with the chief executive and with senior management at most hospital sites. During these meetings, details of the campaign rationale, implementation methods and requirements for executive support were discussed and agreed on.

Authorities were provided with evidence from the WHO guidelines on hand hygiene in

health care supporting the provision of AHR in near-patient locations as the key to helping staff decontaminate their hands.⁶ Additional evidence was given that AHR is more effective, less drying of skin and quicker to use than soap and water.²⁰

2. To use staff champions and local leaders to promote the campaign locally

The tendency of clinicians to model their behaviour on that of peers and colleagues is well known.²¹ Thus, engaging local champions and leaders from among the ward staff was promoted as one of the key aims of the intervention. Local champions and leaders were chosen by individual hospitals and wards. The leaders were briefed by the project officer about their expected role in supporting the project — leading by example, promoting hand hygiene to their peers, and displaying posters with photographs of clinical leaders and a supportive message about the project in ward areas.

3. To market the campaign and maintain its momentum

Using the slogan *Clean hands save lives* and a distinctive logo (Box 1), a social marketing approach was used to promote the campaign. A graphic design agency was engaged early in this phase to develop marketing collateral to support the campaign objectives. Posters targeting key facilitators of and barriers to hand hygiene²² were promoted in a strategy modelled on the successful Geneva campaign.⁴ In addition to project funding from the CEC, NSW Health provided funding for campaign materials.

4. To involve patients, carers and visitors in hand hygiene awareness

Consumer engagement in health care is a key priority of the NSW health care system for all patient care issues,²³ and hand hygiene was identified as an appropriate health care subject on which to engage them. Campaign resources specifically targeting consumers — including posters and a patient information brochure — were developed. Staff were encouraged to engage patients and visitors in the campaign, and wore campaign T-shirts and badges with the campaign logo saying "It's OK to ask" to encourage patients and

visitors to ask HCWs about their compliance with hand hygiene practices.

5. To measure compliance with hand hygiene practices through overt observation and feedback to staff

The power of data to drive change is a well recognised clinical practice improvement technique. A simple audit tool was developed to ensure that the burden of data collection was minimised and local ownership of the data (and thereby "the problem") was maximised. The tool, based on Fulkerson's risk categories,²³ differentiated between high, medium and low risk for infection transfer. As auditing was seen as the province of all clinicians, not just infection control or project personnel, instructions on use of the tool were given to every ward.

6. To measure infection rates with multiresistant organisms in response to changes in hand hygiene practices

The Australian Council on Healthcare Standards had been contracted by NSW Health to collect infection control indicator data for MROs. This enabled statewide analysis for both the pre-campaign and campaign periods.

Implementation

The CEC developed a detailed resource guide, based on the *cleanyourhands* campaign in the UK,¹⁶ and a clear implementation plan for local project officers. The project officers' role was to ensure that campaign strategies were implemented in concert across the state and that appropriate data and reporting requirements were met. Monthly progress reports were tracked against project objectives, including placement of AHR, staff and patient surveys, audit activities, and engagement of staff champions. Project officers reported to their authority and the CEC on the milestones for implementing campaign objectives and issues or problems encountered in individual hospitals. Reports of hand hygiene compliance rates were fed back to staff at ward level.

A detailed evaluation framework was developed to measure the achievement of campaign objectives across the state in a consistent and systematised way. Evaluation included overt observation audits of compliance with hand hygiene practices, review of MRO clinical indicator data, administration of staff surveys and patient/visitor surveys, AHR placement audits, and AHR usage audits. Standardised audit tools were developed for consistency of data collection, and hand hygiene project officers were responsible for coordinating audits and sub-

mitting de-identified data from the campaign evaluation in their AHS. As part of their orientation to the campaign, project officers were trained in undertaking qualitative interviews and observation studies.

Ethics approval

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

RESULTS

Results of the hand hygiene compliance audit are reported in detail elsewhere,²⁴ as are results of the patient and staff surveys²⁵ and secondary outcomes relating to infection with MROs.²⁶

Implementation

Only one AHS had recruited a project officer before the start of the campaign. Four of the eight AHSs recruited part-time staff to fill the project officer role, either to allow better coverage of a large AHS or to allow the role to be absorbed into existing roles. Only two project officers from the smaller AHSs remained for the entire duration of the 12-month project.

Alcohol-based hand rub

Placement

The placement of AHR in near-patient locations was evaluated by audits of product placement conducted before and after the campaign in 10 of the 11 authorities (Box 2). (The audit was not relevant to the Ambulance Service of NSW, which had AHR available in all its mobile vehicles.)

Hospital visits before the campaign identified a lack of appropriately placed AHR at the point of care. By the end of the campaign, there were 13 280 AHR containers available in NSW health facilities. The number of AHR containers per available bed (expressed as a percentage of available beds) ranged from 44% (1488/3363) to 142% (380/268), with a state average of 70% (13 280/18 951) (Box 2). Of the AHR containers available at the bedside, 70% (9254/13 280) were secured in brackets and the rest were unsecured, predominantly on patient drawers, medication trolleys or blood pressure trolleys. The audit did not include non-secure products carried with staff while on the ward.

Usage

Although 73% of respondents to the pre-implementation survey reported already using AHR at the point of patient care, the use of AHR, based on purchasing patterns, increased during the campaign from 1477 L in February 2006 to 5568 L in February 2007.¹⁷

Barriers and concerns

Some authorities reported difficulty in placing AHR containers because of concerns about storage of a flammable product, space limitations on storing a large number of AHR products, and patient safety issues in specific specialty areas such as mental health and paediatrics. As alcohol-based products are banned in corrective services facilities in NSW, these services had to modify their implementation strategies to accommodate the local situation. Concerns about patient safety by a paediatric hospital required negotiations with the staff, resulting in the product being placed on the wall out of reach of patients and young visitors. Similarly, mental health and aged-

care services were initially reluctant to participate because of concerns that patients may consume the AHR. These concerns (later shown to be unfounded) were again allayed by judicious placement of AHR. All of these issues were resolved through consultation with clinicians and the clinical product managers group, and a supporting safety alert was broadcast by NSW Health to all authorities. Two AHSs subsequently developed area-specific policies for the placement of AHR.

Concerns were also raised through the project officers about systemic absorption of AHR and the potential to contravene blood alcohol driving regulations for staff engaged in home visiting (community health workers) and for pregnant staff members, for whom alcohol consumption is contraindicated. Coincidentally, during the campaign, a safety alert from the United States was broadcast via the Internet about the risk to HCWs of shock or burn from vigorous application of AHR while generating a static electrical charge on synthetic carpet floors. Such concerns were dispelled through promulgation of relevant information.^{27,28}

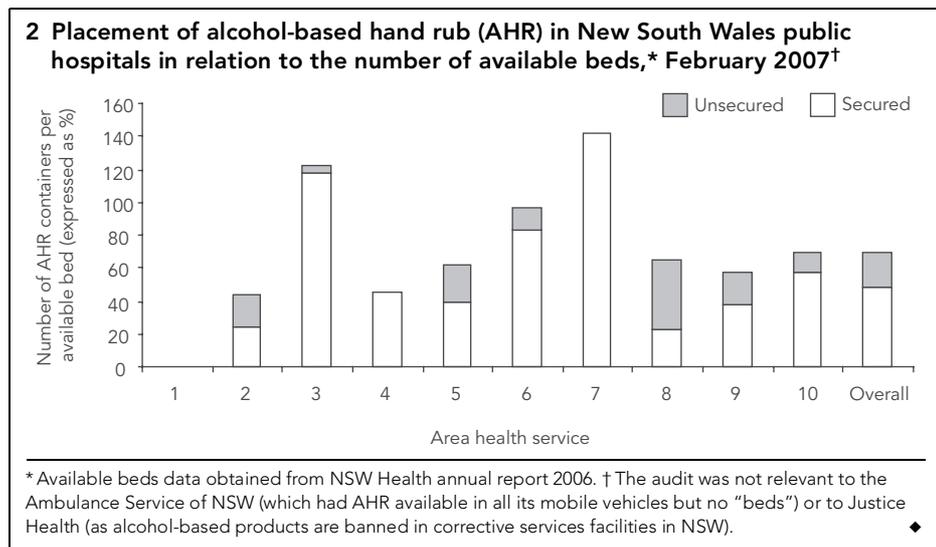
Support and resistance

Support from medical, nursing and allied health staff and from other organisations was crucial for sharing key hand hygiene messages across NSW. A number of organisations, such as the NSW Medical Board and Nurses Registration Board, provided letters of support for the campaign and published information for members in their newsletters or journals. This support was essential for lending credibility to the campaign and fostering an understanding of its importance in the wider health context.

However, there were frequent requests, particularly from senior medical staff, for evidence of the effectiveness of hand hygiene practices. Project staff and clinical champions reported resistance on the part of certain clinicians to following hand hygiene recommendations, based on their perception of a lack of evidence for the intervention. This phenomenon was encountered at all levels and in all areas of the health care system, despite high-level support and endorsement of the campaign by the professional medical colleges and the NSW Medical Board.

Campaign materials

Campaign materials developed to support the objectives and key messages of the campaign included T-shirts and balloons with the campaign logo, staff and patient information brochures, posters with 15 different messages (Box 3), and a website (<http://>



www.cec.health.nsw.gov.au/programs/clean-hands.html). Messages displayed by the campaign materials emphasised the ease of use and effectiveness of AHR in minimising spread of infection and dispelled myths about the spread of MROs.

The materials were a means of standardisation so that HCWs and patients received the same information and messages regardless of their location. The patient/visitor brochures were produced in hard copy in English and electronically in 22 languages.

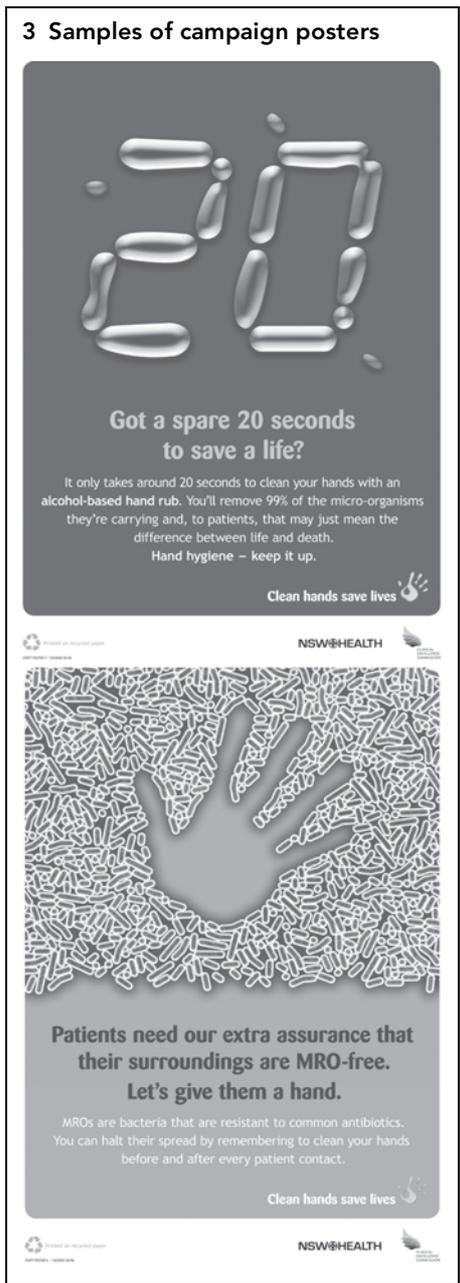
In October 2006, the CEC provided campaign posters to the television station Channel 7 to display on the set of its hospital-based drama “All Saints”, with posters aired on episodes screened in early 2007.

DISCUSSION

The principal aim of the *Clean hands save lives* campaign was to begin to systematise the practice of hand hygiene for before- and after-patient contact.

Resistance to change is a significant barrier to any improvement strategy. When the necessary change challenges personal behaviour and deeply held (often subconscious) beliefs, resistance is likely to be strong. The hand hygiene behaviour of HCWs is likely to be the product of lessons learned in childhood, and has been described by Whitby and colleagues as either “inherent” or “elective”.¹⁵ That is, HCWs make a decision as to whether or not to comply with hand hygiene practices based on personal beliefs and a perception of the risk that the patient poses to them. Rather than reconstruct the psychological paradigm of a practice developed during childhood, we chose to challenge HCWs to disregard their self-protective perception in elective hand hygiene behaviour by using a campaign approach to begin systematising the practice. The issue of the personal development of hand hygiene practice is explored in depth elsewhere.^{15,29}

The campaign approach was used to challenge misconceptions and outlier behaviour. The groundswell of change was intended to establish a degree of momentum to improve hand hygiene compliance. With the mobility of staff across the NSW health system, it was both logical and desirable to coordinate such an important activity on a statewide basis, thereby minimising duplication of effort and allowing standardisation of data collection methods, strategies for improvement and campaign resources. The opportunity cost to be realised from a centralised project management and large-scale development of campaign resources was clearly evident.



The strategies employed also mirrored the hierarchy of error reduction strategies as described by Canada's Institute for Safe Medication Practices (Box 4).³⁰ Lower-order strategies used included education, provision of information, and development of rules and policies. There was standardisation of the message of practice, with overt observation audits emphasising the need to follow hand hygiene practices before and after patient care activities. The near-patient location of AHR, with products secured by brackets in these locations wherever possible, constituted “forcing functions and constraints”.

A hand hygiene campaign was recently rolled out in 75 hospitals in Victoria.³¹ The campaign correlated the supply of AHR with hand hygiene rates to establish a trend in rates. Although this method may not be reliable, especially in the winter months (when HCWs are less inclined to use AHR or wash with cold water), we believe the measurement indicates that the crucial element of the campaign — making AHR available at the point of care — was successful. Our February 2007 audits showed that, on average, 70% of available beds had AHR either secured near the bed or unsecured but located close to the bed or point of care.

In a 1994 discussion of medical error, Leape advised that proven error reduction strategies needed to be applied at every stage of clinical practice, and reminded the health care profession of Florence Nightingale's dictum, “first do no harm”.³² Four years later, Vincent and colleagues applied a “human factors” model to the analysis of risk and safety in clinical medicine and postulated that some quality and safety initiatives may have limited impact because they rely on only one level of intervention, such as training or protocol development.³³ It is now recognised that the impact of safety initiatives is directly related to a hierarchy of multiple strategies,³⁰ and that a multifaceted approach improves the chances of success in implementing change.

The primary aim of the Victorian campaign³¹ was reducing infection with methicillin-resistant *Staphylococcus aureus*. Our campaign was all about engagement — of participants, consumers and leaders — to facilitate change. In our campaign, levels of engagement were variable within and between the organisations involved. Engagement at the executive level, to fast-track recruitment of project officers (on whom the campaign was heavily reliant), was often hard to achieve and even harder to maintain, with only one project officer remaining in the dedicated role throughout the campaign.

During the early stages of organisational culture change, dedicated champions are pivotal to maintaining targeted behaviour. The less-than-optimal rates of hand hygiene com-

- 4 Rank order of error reduction strategies (in decreasing order)³⁰**
- Forcing functions and constraints
 - Automation and computerisation
 - Standardisation and protocols
 - Checklists and double-check systems
 - Rules and policies
 - Education and information

pliance observed in our study may reflect the low retention rate of dedicated project officers. A similar pattern was apparent in the Victorian campaign, with hand hygiene compliance rates dropping during periods of absence of key staff.³¹ Executive support for the short-term increase in expenditure on AHR was also required, yet some executives found this easier to achieve than others. Engagement of clinical leaders, especially doctors, was also variable. The failure to consistently model appropriate behaviour may explain why hand hygiene rates among doctors remained poor.²⁹ With more than 108 000 people working in the NSW health care system, the majority in clinical roles, there were challenges and complexities in embarking on a large-scale program to systematise and standardise what is essentially personal behaviour and thereby change the culture of busy clinicians.

In spite of the difficulties in changing hand hygiene practices, and starting with a low base of compliance, little structured activity before the campaign and limited resources, a significant system-wide improvement in hand hygiene compliance beyond a Hawthorne effect was achieved. Further work on hand hygiene, such as the newly announced Hand Hygiene Australia program, will undoubtedly continue to strengthen the clinical leadership role of doctors to drive the groundswell of change across the country. The social change in community perceptions of hand hygiene and the acceptance of AHR in daily living activities (noted through recent advertising in the general media of AHR products available in supermarkets for everyday use) will assist in improving compliance with hand hygiene practices in hospitals.

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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 On-X Life Technologies pays the expenses. He has received funding from Roche Diagnostics for travel expenses to attend meetings.

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