

Improved Hand Hygiene to Prevent Health Care-Associated Infections

Patient Safety Solutions

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► STATEMENT OF THE PROBLEM AND IMPACT:

It is estimated that at any one time, more than 1.4 million people worldwide are suffering from infections acquired in hospitals (1,2). Health care-associated infections (HAI) occur worldwide and affect both developed and developing countries. In developed countries, between 5% and 10% of patients acquire one or more infections and 15%–40% of patients admitted to critical care are thought to be affected (3). In resource-poor settings, rates of infection can exceed 20% (4), but available data are scanty and more research is urgently needed to assess the burden of disease in developing and transitional countries.

In the United States of America (USA), one in every 136 patients becomes severely ill as a result of acquiring an infection in hospital (5). This is equivalent to 2 million cases per year, incurring additional costs of US\$ 4.5–5.7 billion and about 90 000 deaths. In England, 100 000 cases of HAI are estimated to cost the NHS a minimum of £1 billion per year (6) with more than 5000 attributable deaths annually (7). In Mexico, the estimate is 450 000 infections, causing 35 deaths per 100 000 neonatal admissions, with a fatality rate of between 4% and 56% (8).

► BACKGROUND AND ISSUES:

There is substantial evidence that hand antisepsis reduces the incidence of HAI (9–24). Hand hygiene is therefore a fundamental action for ensuring patient safety, which should occur in a timely and effective manner in the process of care. However, unacceptably low compliance with hand hygiene is universal in health care (25). This contributes to the transmission of microbes capable of causing avoidable HAIs. Better adherence to hand hygiene guidelines and policies has been shown to reduce the spread of HAI (26–32). The key targets for action are not only health-care workers but also policy-makers and organizational leaders and managers (33).

Published research suggests that multimodal, multidisciplinary strategies that focus on system change (11,14,18,20–25), offer the greatest chance of success in terms of hand hygiene improvement and infection reduction.

The objective of any hand hygiene solution is therefore to build or strengthen capacity so that hand hygiene improvement is seen as and becomes an integrated component of a broader HAI prevention strategy.

► SUGGESTED ACTIONS:

The following strategies should be considered by WHO Member States.

1. Promote hand hygiene adherence as a health care facility priority; this requires leadership and administrative support and financial resources.
2. Adopt at country, region, and facility levels the nine recommendations of the WHO Guidelines on Hand Hygiene in Health Care (Advanced Draft), in particular the implementation of multidisciplinary, multimodal hand hygiene improvement strategies within health care facilities that incorporate:
 - a. Provision of readily accessible alcohol-based handrubs at the point of patient care .
 - b. Access to a safe continuous water supply at all taps/faucets and the necessary facilities to perform hand hygiene.
 - c. Education of health-care workers on correct hand hygiene techniques.
 - d. Display of promotional hand hygiene reminders in the workplace.
 - e. Measurement of hand hygiene compliance through observational monitoring and feedback of performance to health-care workers.

- Where alcohol-based handrubs are not available or are too costly, consider local production of handrubs using the formula described in the *WHO Recommended Hand Antisepsis Formulation: Guide to Local Production*.

Definition: Point of care - refers to a hand hygiene product (e.g. alcohol-based handrub) which is easily accessible to staff by being as close as possible (as resources permit) to where patient contact is taking place.

Point of care products should be within an arms reach of care/treatment delivery.

This enables staff to quickly and easily fulfil the five moments for hand hygiene which have been developed from the WHO Guidelines on Hand Hygiene in Health Care (Advanced Draft) (<http://www.who.int/gpsc/tools/en/>)

The product must be capable of being used at the required moment, without leaving the zone of activity.

Point of care is usually achieved through staff-carried handrubs (pocket bottles) or handrubs fixed to the patients bed or bedside table (or around this area). Handrubs affixed to trolleys or placed on a dressing or medicine tray which are then taken into the zone of activity also fulfil this definition.

▶ LOOKING FORWARD:

- Consider measuring the financial and economic aspects of health care-associated infections to assist in demonstrating their impacts.
- Inform and educate patients about the importance of hand hygiene and their role in supporting improvements.

▶ APPLICABILITY:

- All healthcare facilities, where patient care and/or treatment is provided.

▶ OPPORTUNITIES FOR PATIENT AND FAMILY INVOLVEMENT:

- Raise the awareness of patients and their families/visitors of the risks to health when lapses in timely and appropriate hand hygiene occur.
- Produce information for patients and their families that highlights the importance of better hand hygiene.
- Encourage staff to clean their hands in the presence of the patient prior to touching the patient, invite patients to ask staff if they have cleaned their hands prior to treatment, if culturally appropriate.
- Educate patients on correct hand hygiene technique and indications to ensure they are aware of the correct moments for hand hygiene.

▶ STRENGTH OF EVIDENCE:

- Based on experimental, clinical, and epidemiological studies, theoretical rationale, and a consensus of experts.

▶ POTENTIAL BARRIERS TO IMPLEMENTATION:

Barriers exist on a number of levels from national political commitment through to the individual health-care worker. Implementation is also influenced by levels of resources, general approaches to quality, and perception. The potential barriers are outlined in the Table 1:

Table 1 – Potential Barriers to Implementation

	Political	Institutional/managerial	Individual/behavioural
Financial	<ul style="list-style-type: none"> ▶ Competing health priorities ▶ Failure to develop a business case to demonstrate (macro-) economic benefits 	<ul style="list-style-type: none"> ▶ Costs of infrastructure ▶ Costs of alcohol-based handrub ▶ Failure to convince managers and leaders of (micro-) economic benefits ▶ Inability to manufacture alcohol-based handrub ▶ Staffing shortages ▶ Facility design 	<ul style="list-style-type: none"> ▶ No financial incentive to modify performance (continuous education)
Quality	<ul style="list-style-type: none"> ▶ Lack of commitment ▶ Lack of infrastructure ▶ No commitment to education (pre-service and in-service) 	<ul style="list-style-type: none"> ▶ Lack of commitment ▶ Existing culture not supportive ▶ Failure to convince managers and leaders of health benefits ▶ Time for staff training ▶ Lack of time for compliance monitoring 	<ul style="list-style-type: none"> ▶ Lack of health-care worker buy-in ▶ Campaigns are not at right target ▶ Lack of patient participation and empowerment ▶ Existing culture is not supportive
Perception	<ul style="list-style-type: none"> ▶ Lack of awareness of the burden of disease ▶ Perception that hand hygiene is no longer a problem 	<ul style="list-style-type: none"> ▶ Existing organizational culture not supportive 	<ul style="list-style-type: none"> ▶ Lack of institutional leaders buy-in ▶ Lack of awareness of the issues ▶ Perception that hand hygiene is no longer a problem ▶ Low belief in the value of hand hygiene in terms of impacting on patient outcome

► RISKS FOR UNINTENDED CONSEQUENCES:

- Heightened patient and carer anxiety if messages are miscommunicated.
- Safety issues associated with ingestion of the alcohol-based handrub for paediatric patient populations, substance abuse patients, or those who are confused.
- Although very low risk, flammability issues and fire hazards associated with alcohol-based handrub. The benefits of utilizing this type of handrub far exceed the minimal risk.

► REFERENCES:

1. Tikhomirov E. WHO Programme for the control of hospital infections. *Chemioterapia*, 1987, 3:148–151.
2. Vincent JL. Nosocomial infections in adult intensive-care units. *Lancet*, 2003, 361:2068–2077.
3. Lazzari S, Allegranzi B, Concia E. Making hospitals safer: the need for a global strategy for infection control in healthcare settings. *World Hospitals and Health Services*, 2004, 32, 34, 36–42.
4. Pittet D. Infection control and quality health care in the new millennium. *American Journal of Infection Control*, 2005, 33(5):258–267.
5. Starfield B. Is US health really the best in the world? *Journal of the American Medical Association*, 2000, 284:483–485.
6. The Socio-economic burden of hospital acquired infection. *Public Health Laboratory Service*, 1999.
7. Mayor S. Hospital acquired infections kill 5000 patients a year in England. *BMJ*, 2000, 321:1370.
8. Zaidi AK et al. Hospital acquired neonatal infections in developing countries. *Lancet*, 2005, 365:1175–1188.
9. Casewell M, Phillips I. Hands as route of transmission for *Klebsiella* species. *BMJ*, 1977, 2:1315–1317.
10. Doebbeling BN et al. Comparative efficacy of alternative hand-washing agents in reducing nosocomial infections in intensive care units. *New England Journal of Medicine*, 1992, 327:88–93.
11. Webster J, Faoagali JL, Cartwright D. Elimination of methicillin-resistant *Staphylococcus aureus* from a neonatal intensive care unit after hand washing with triclosan. *Journal of Paediatrics and Child Health*, 1994, 30:59–64.
12. Zafar AB et al. Use of 0.3% triclosan (Bacti-Stat) to eradicate an outbreak of methicillin-resistant *Staphylococcus aureus* in a neonatal nursery. *American Journal of Infection Control*, 1995, 23:200–208.
13. Pittet D et al. Effectiveness of a hospital-wide programme to improve compliance with hand hygiene. *Infection Control Programme. Lancet*, 2000, 356:1307–1312.
14. Larson EL, et al. An organizational climate intervention associated with increased handwashing and decreased nosocomial infections. *Behavioral Medicine*, 2000, 26:14–22.
15. Conly JM et al. Handwashing practices in an intensive care unit: the effects of an educational program and its relationship to infection rates. *American Journal of Infection Control*, 1989, 17:330–339.
16. Simmons B et al. The role of handwashing in prevention of endemic intensive care unit infections. *Infection Control and Hospital Epidemiology*, 1990, 11:589–594.
17. MacDonald A et al. Performance feedback of hand hygiene, using alcohol gel as the skin decontaminant, reduces the number of inpatients newly affected by MRSA and antibiotic costs. *Journal of Hospital Infection*, 2004, 56:56–63.
18. Swoboda SM et al. Electronic monitoring and voice prompts improve hand hygiene and decrease nosocomial infections in an intermediate care unit. *Critical Care Medicine*, 2004, 32:358–363.
19. Hilburn J et al. Use of alcohol hand sanitizer as an infection control strategy in an acute care facility. *American Journal of Infection Control*, 2003, 31:109–116.
20. Lam BC, Lee J, Lau YL. Hand hygiene practices in a neonatal intensive care unit: a multimodal intervention and impact on nosocomial infection. *Pediatrics*, 2004, 114:e565–571.
21. Won SP et al. Handwashing program for the prevention of nosocomial infections in a neonatal intensive care unit. *Infection Control and Hospital Epidemiology*, 2004, 25:742–746.
22. Zerr DM et al. Decreasing hospital-associated rotavirus infection: a multidisciplinary hand hygiene campaign in a children's hospital. *Pediatric Infectious Disease Journal*, 2005, 24:397–403.
23. Rosenthal VD, Guzman S, Safdar N. Reduction in nosocomial infection with improved hand hygiene in intensive care units of a tertiary care hospital in Argentina. *American Journal of Infection Control*, 2005, 33:392–397.
24. Johnson PD et al. Efficacy of an alcohol/chlorhexidine hand hygiene program in a hospital with high rates of nosocomial methicillin-resistant *Staphylococcus aureus* (MRSA) infection. *Medical Journal of Australia*, 2005, 183:9–14.
25. Pittet D, Boyce JM. Revolutionizing hand hygiene in health-care settings: guidelines revisited. *Lancet Infectious Diseases*, 2003, 3:269–270.

26. Harrison WA et al. Bacterial transfer and cross-contamination potential associated with paper-towel dispensing. *American Journal of Infection Control*, 2003, 31:387–391.
27. Barker J, Vipond IB, Bloomfield SF. Effects of cleaning and disinfection in reducing the spread of Norovirus contamination via environmental surfaces. *Journal of Hospital Infection*, 2004, 58:42–49.
28. ElShafie SS, Alishaq M, Leni Garcia M. Investigation of an outbreak of multidrug-resistant *Acinetobacter baumannii* in trauma intensive care unit. *Journal of Hospital Infection*, 2004, 56:101–105.
29. Sartor C et al. Nosocomial *Serratia marcescens* infections associated with extrinsic contamination of a liquid nonmedicated soap. *Infection Control and Hospital Epidemiology*, 2000, 21:196–199.
30. Duckro AN et al. Transfer of vancomycin-resistant *Enterococci* via health care worker hands. *Archives of Internal Medicine*, 2005, 165:302–307.
31. Passaro DJ et al. Postoperative *Serratia marcescens* wound infections traced to an out-of-hospital source. *Journal of Infectious Diseases*, 1997, 175:992–995.
32. Chang HJ et al. An epidemic of *Malassezia pachydermatis* in an intensive care nursery associated with colonization of health care workers' pet dogs. *New England Journal of Medicine*, 1998, 338:706–711.
33. WHO Guidelines on Hand Hygiene in Health Care (Advanced Draft) 2006.

▶ OTHER SELECTED RESOURCES:

1. AAOS online fact sheet: Twelve steps to a safer hospital stay: www.orthoinfo.aaos.org/
2. AHRQ Publication No. 01-0040a: www.ahrq.gov/consumer/
3. Centers for Disease Control and Prevention: <http://www.cdc.gov/cleanhands/>
4. The First Global Patient Safety Challenge: <http://www.who.int/gpsc/en/index.html>
5. The Joint Commission Speak Up Safety Initiative: www.jcaho.org/general+public/gp+speak+up/infection_control_brochure.pdf
6. National Patient Safety Agency: cleanyourhands campaign: www.npsa.nhs.uk/cleanyourhands
7. National Quality Forum (NQF) Safe Practices for Better Health Care: http://www.qualityforum.org/projects/completed/safe_practices/
8. NPSF Preventing Infections in the Hospital: www.npsf.org/html/prevent_infections.html
9. Partners in Your Care: www.med.upenn.edu/mcguckin/handwashing/
10. Swiss Noso: <http://www.swiss-noso.ch/>
11. United States Guidelines on Hand Hygiene: <http://www.cdc.gov/handhygiene/>
12. University Hospitals Geneva Hand Hygiene Improvement web site: <http://www.hopisaffe.ch/>
13. World Alliance for Patient Safety: <http://www.who.int/patientsafety/en/>

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