

Hand hygiene in health-care facilities

Access to basic water, sanitation and hygiene in health-care facilities is critical to delivering quality services and advancing health. Hand hygiene is an important and cost-effective intervention to protect health in health-care settings, but practices among health-care workers around the world remain unacceptably low. This briefing highlights key factors to consider when developing strategies to improve hand hygiene in health-care settings, based on WHO guidelines, recent systematic reviews and WaterAid's policy and programmatic experience.

Background

Equitable, inclusive and sustainable access to water, sanitation and hygiene (WASH) is an essential component of delivering quality health care. Hand hygiene among health-care workers is particularly critical to reducing the transmission of disease, preventing health-care associated infections (HCAIs),ⁱ tackling anti-microbial resistance and ultimately improving the health outcomes of patients. Despite this, compliance with hand-hygiene guidelines among health-care workers globally is worryingly low. A systematic review of 96 studies conducted in hospitals in high-income countries estimates an average hand-hygiene compliance rate of 40% among health-care workers.¹ This is thought to be even lower in many developing country settings, with some studies reporting compliance rates as low as 2.1%.²

Poor hand hygiene among health-care workers in low-income and middle-income countries (LMICs) is due in part to inadequate access to, and use of, WASH services in health-care facilities. A recent report with data from more than 66,000 health-care facilities across 54 LMICs highlights the huge gaps in access to WASH across different levels of the health system (see Table 1).³

Table 1: WASH in health systems in low- and middle-income countries

WASH element	Definition	Percentage of facilities without access
Improved water source	Presence of a water source or water supply in or near the facility (within 500m) for drinking, personal hygiene, medical activities, cleaning, laundry and cooking.	38%
Improved sanitation	Presence of latrines or toilets in the facility. Does not consider functionality or accessibility.	19%
Hygiene	Availability of handwashing stations with soap or alcohol-based hand rubs within the facility	35%

Source: Water, sanitation and hygiene in health care facilities (WHO & UNICEF, 2015).

ⁱ Health-care associated infections (HCAIs) are infections acquired as a result of health care.

Without access to WASH, health-care workers cannot maintain adequate hand hygiene. Ease of access to materials including soap, water or alcohol handrubs at the point of care is critical to improving compliance in these settings. Furthermore, current indicators for monitoring WASH in health-care facilities likely underestimate the scale of the problem in many countries, given that they do not comprehensively measure quality, quantity and functionality of these services.

Poor hand hygiene among health-care workers presents a serious threat to patient safety, particularly in terms of HCAs. Notwithstanding the direct and immediate impact on mortality and morbidity, HCAs can result in long-term disability, prolonged hospital stays and excessive costs for patients, families and health systems. The global burden of HCAs remains largely unknown due to limited reliable data; however, evidence from Europe indicates that HCAs affect over four million patients every year, causing 16 million extra days in hospital and 37,000 deaths annually. In economic terms this results in approximately €7 billion per year in direct health care-related costs alone.⁴ The scale and impact of HCAs in LMICs is thought to be even higher given the substantial human and financial barriers facing health systems in these settings. Evidence from one study has shown that infections acquired in intensive care units are at least two-fold to three-fold higher in LMICs than in high-income countries (HICs), indicating huge disparities between countries of different income status.⁵ Furthermore, the absence of good WASH provisions and subsequent risk of infections can contribute to the increased use of antibiotics, thereby contributing to the growing threat of anti-microbial resistance.

Improving hand hygiene in practice: how and when?

Hand hygiene is widely considered the primary measure to reduce HCAs and has direct implications for the quality and safety of services being delivered. As such, poor hand hygiene hinders progress towards achieving Universal Health Coverage (UHC). The World Health Organization (WHO) definition of UHC encompasses three objectives that include equity of access, quality of services and financial risk protection. Since inadequate hand hygiene compromises the ability of health-care workers to deliver quality health care, UHC will not be realised without overcoming barriers to good hand hygiene.

The *2009 WHO Guidelines on hand hygiene in health care* outline the most recent evidence-based recommendations for hand hygiene in health-care facilities. The guidelines state that health-care workers should their wash hands with soap and water or use an alcohol-based handrub. Figure 1 depicts WHO's 'My five moments of hand hygiene' concept, which is based on evidence that the transmission of pathogens can be prevented if health-care workers practice hand hygiene at five critical moments.⁶

Figure 1: Five key moments of hand hygiene in health-care facilities, WHO



Source: WHO Guidelines on hand hygiene in health-care facilities (2009)

Barriers to hand hygiene in health-care facilities

Despite substantial evidence of health impact and the availability of global guidance, translating hand-hygiene guidelines into practice is a persistent challenge. The factors that influence optimal hand hygiene practices are complex and multifaceted, and include individual and system-level, as well as local, religious and cultural considerations. Many of the key barriers are highlighted in WHO's current guidelines on hand hygiene, which include:⁶

- **Infrastructure:** Compliance with hand hygiene requires adequate hygiene resources at the right time and right location, such as availability of handwashing stations, water and soap, or alcohol handrubs. Access to WASH is a particular challenge in resource-poor settings, with many health-care facilities lacking the infrastructure and commodities to practice good hand hygiene.
- **Understaffing, overcrowding and insufficient time:** In settings with insufficient financial and human resources, lack of time is an important observed and self-reported barrier to hand hygiene.
- **Inconsistent compliance across different cadres of health-care workers:** Doctors are often reported to have lower rates of hand hygiene compliance compared to nurses, although this does differ across studies and settings. In Nigeria, hand-hygiene compliance was highest among nurses (72.9%) compared to doctors (59.7%) following a hand hygiene intervention.⁷ However, in Mali the inverse relationship was seen when doctors showed much higher compliance than nurses (20.3% versus 4.4% respectively).⁶
- **Medical glove use:** The use of gloves by health-care workers is recommended to reduce the risk of contaminating hands and to reduce the risk of spreading germs. There is concern however that wearing gloves may impact on health-care workers compliance with hand-hygiene guidelines,

although the evidence is not definitive. This is likely because health-care workers feel adequately protected wearing gloves and therefore do not feel the need to wash their hands. Use of gloves should not replace the use of soap and water, and it is recommended that hand hygiene be performed both before and after glove use.⁸

- **Skin reactions:** Repeated hand-hygiene practices have been associated with increased skin reactions to water and disinfectants, which can dissuade health-care workers from frequently washing their hands.
- **Behaviour, religious and cultural considerations:** Behavioural theories highlight that hand-cleansing practices are established early in life, and subsequently affect attitudes and behaviour throughout life. It is suggested that inherent hand hygiene (occurring in response to the emotional feeling of 'dirtiness' often after touching something or someone) and elective hand hygiene (handwashing at more specific opportunities, such as before touching a patient for their protection) are influenced by religious, cultural, emotional and educational factors. It is the elective element of hand hygiene which is likely the most omitted by health-care workers because it is not an inherent behaviour and must be learned.

Improving practices

Given the multitude of factors influencing hand-hygiene practices among health-care workers, improving compliance requires strategic targeting of different actions and behaviours. The WHO *Multimodal hand hygiene improvement strategy* was developed as a practical tool to help implement the WHO *Guidelines on hand hygiene in health care*,⁹ and was tested in a number of countries around the world to assess its feasibility and reliability. Experience from Mali highlights the success of this approach in developing a hand-hygiene intervention in hospital settings, which resulted in the implementation of the strategy at national level (see Box 1).

Box 1: Improving hand hygiene in Hopital du Point G, Mali

Hopital du Point G, a 456-bed hospital in Bamako, Mali, was selected to take part in a study to improve hand hygiene based on WHO's *Guidelines on hand hygiene in health care*. The implementation of a hand-hygiene promotion strategy involved five three-hour education sessions for health care workers, along with posters displaying hand-hygiene indications and techniques fixed in wards. All health-care workers were given an individual 100ml bottle of alcohol handrub.

Six months after implementation, hand-hygiene compliance was re-evaluated and found to have increased from 8% at baseline to 21.8%. Handrubbing with alcohol-based handrub was the primary method of hand hygiene. Knowledge scores, based on WHO questionnaires, also increased significantly. To ensure sustainability, hand-hygiene promotion was included in the annual management plan for the hospital. The success of the project has encouraged the Government of Mali to implement the strategy at a national level.

Source: Guidelines on hand hygiene in health care (WHO, 2009).

While much is understood about the barriers to hand-hygiene compliance, less is known about the effectiveness of different interventions to address these. A review of the latest literature provides some insights on what approaches have proven effective in health-care settings.

Review of the latest evidence

A review of literature on hand hygiene in health-care settings published between 2010 and 2015 was conducted in order to capture studies published following the release of 2009 WHO guidelines. Three systematic reviews on the topic were identified^{10,11,12} along with 56 additional studies published after the systematic reviews, published between January 2012 and June 2015. Based on these studies, a number of key findings emerge from the latest evidence:

- **Multifaceted interventions:** Multimodal interventions are generally more effective than single-intervention strategies; however, determining which individual components are most effective is challenging. The importance of targeting a variety of different behavioural determinants of hand hygiene including those less commonly addressed (such as social influence, attitude, self-efficacy and intention) was also identified.¹⁰
- **Contextual factors:** Sustainable change will not be achieved without consideration of existing local barriers, including social and management structures within health-care settings. Designing strategic plans to overcome these barriers at different levels with a focus on social marketing, administrative support, feedback and monitoring, as well as stakeholder involvement and leadership, are found to contribute to successful interventions.^{7,13}
- **Electronic monitoring:** Electronic devicesⁱⁱ are useful tools in providing long-term monitoring and feedback of compliance, as well as acting as a visible reminder for health-care workers.^{14,15}
- **Behaviour change interventions:** Innovative behaviour change interventions developed through formative researchⁱⁱⁱ can provide important techniques for influencing hand-hygiene compliance. For example, the positive deviance approach where individuals who face the problem but handle it more effectively than their peers (positive deviants) are encouraged and supported to determine the solutions and influence other staff and management with their own ideas to improve compliance.¹⁴

ⁱⁱ Electronic devices include hand-hygiene counters, motion-sensing LED lights, and motion-signal activated audible hand-hygiene reminders at in the entrances to wards.

ⁱⁱⁱ Formative research includes understanding the interests, attributes and needs of different populations and persons in a particular community, with the idea of making interventions both culturally and geographically appropriate.

Next steps: research, policy and programming

Effective and sustainable improvements in hand hygiene in health-care facilities are an ongoing challenge, requiring action at multiple levels including research, policy and programming. Based on recommendations by WHO and those highlighted in the literature, a number of areas for future research have been identified, along with key policy and programmatic approaches that countries can take to overcome barriers.

Research priorities

Despite increasing evidence for effective hand-hygiene interventions that include multimodal strategies and infrastructure improvement, quality of research remains a barrier to informing evidence-based recommendations and driving policy change. Future research should be strengthened in areas including:

- **Resource-poor settings:** Relatively few studies are conducted in resource-poor settings; further studies should investigate different strategies for hand-hygiene promotion in these settings. This would include studying the impact of cultural practices on hand-hygiene behaviour and the use of hand-hygiene products in tropical climates. Furthermore, it would include establishing the most appropriate method to keep water safe for use, including hand hygiene, when stored at the point of care.
- **Economic evaluations:** There is a need for more cost-benefit, cost-utility and cost-effectiveness analyses of improving hand hygiene in resource-poor settings. This could include evaluations of introducing alcohol-based handrub.
- **Health outcomes:** Studies to analyse the impact of improved hand hygiene in terms of microbiological and infectious outcomes will be critical to informing policy and practice, in particular to determine the percentage increase in hand hygiene adherence required to achieve predictable risk reduction in infection rates.
- **Multidisciplinary research:** Studies involving theoretical frameworks based on behavioral and social science, using mixed method approaches and involving local clinicians and policy makers are needed to identify effective interventions.¹¹
- **Other research:** Additional research considerations include determining the effect of the quality and temperature of water on effective hand hygiene, and identifying the determinants of hand-washing behaviour through formative research. Future academic research should prioritise robust randomised controlled trials, which have an adequate follow-up period to determine sustainable best practices.^{10,12}

Policy and programmatic priorities

Based on literature currently available, along with programmatic experience, a number of recommendations are highlighted to overcome some of the key barriers regarding access to WASH in health-care facilities. These include:

- **Strengthening national policies and plans:** Countries with national plans and policies in place for WASH in health-care facilities have a greater proportion of facilities with functioning water systems, indicating this is an important element in improving services.
- **Facility-based risk assessments:** Systematic identification of risks allows for appropriate management and prioritisation of limited WASH services, particularly in the short-term, while long-term infrastructural improvements are planned.
- **Training staff:** Sufficient training of health-care workers and other staff on WASH alongside training on infection control and prevention – including when to deliver WASH messages to patients – is essential to improve hand hygiene, while also ensuring risk management strategies are implemented.
- **Monitoring:** The development of a harmonised set of indicators on WASH services in health-care facilities is critical to determine access, functionality, safety and equity. Furthermore, strengthening national health management information systems (HMIS) to include WASH in routine monitoring of health services is central to effective monitoring of progress.
- **Behaviour-change interventions:** Designing effective behaviour-change interventions through a creative process informed by formative research, and implementation using novel approaches, could significantly improve hand-washing compliance in health-care settings.
- **Advocacy:** The development of key advocacy messages tailored to specific audiences, including evidence of the health and economic impact of hand hygiene, helps to build demand for basic WASH services in health-care facilities by health professionals, patients and communities.

Box 2: What this means for WaterAid and Soapbox

- WaterAid recognises the critical need for equitable, inclusive and sustainable access to WASH in health-care facilities to deliver quality health-care and attain universal coverage goals by 2030. WASH in health-care facilities is a priority area for the next five years, of which hand hygiene is a critical component.
- WaterAid will support countries to develop appropriate policies, guidelines and standards to improve WASH in health-care facilities. Part of this work will include identifying key blockages and opportunities to strengthen existing systems, and support and build health-system capacity to lead efforts of this issue.
- Between 2016 and 2019, WaterAid in collaboration with Soapbox (and with aid funding from the UK government), will work in three countries to improve WASH services in health-care facilities and communities.
- The Soapbox Collaborative – in addition to work undertaken in partnership with WaterAid – is leading a number of other projects based on its work to date around WASH and hand hygiene in health-care facilities. In late 2015, Soapbox will be leading a Medical Research Council-funded study to develop a novel intervention targeted at improving hand hygiene during and after health-care facility births. Hand hygiene is also a key feature in the Soapbox training manual which has been developed (and soon to be piloted) for domestic services staff, or cleaners in LMICs; this is a neglected cadre of the workforce despite its key role in maintaining environmental cleanliness and safety in health-care facilities.

Conclusion

Hand hygiene is an important indicator of the quality of health services and patient safety more widely. The issue of hand hygiene in health-care settings has many unresolved issues that require further research to inform policies and programming. Addressing the issues related to research, policy and programming highlighted in this document will be critical to informing evidence-based best practice in LMICs. The evidence overwhelmingly supports the need for a multifaceted approach to improve hand hygiene compliance, targeting different barriers and behaviours simultaneously. Within this, it is essential that infrastructure issues related to access to adequate and sustainable WASH services in health-care facilities remain at the core of every effort to improve hand hygiene. Failure to make progress in this area will severely compromise other efforts to improve hand hygiene.

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