

THE STATE OF
Hand Hygiene

2017

Do We Need a Bundle?



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Do We Need a Bundle?

ABSTRACT

Hand hygiene has been recognized for more than 150 years as the single most effective method of preventing healthcare associated infections (HAI). And yet, for the past several decades compliance has been reported by published accounts to have remained, on average, less than 50 percent¹. There has been success in reducing HAI of multiple types according to the Centers for Disease Control and Prevention (CDC) HAI Progress report, though zero infections in any category is still an aspirational goal². And there have been published accounts of localized projects employing a variety of approaches resulting in improved hand hygiene. Yet sustained nationwide improvement in hand hygiene compliance has remained elusive, even after multiple national guidelines, numerous performance improvement initiatives, and educational programs. The one approach that is common to numerous reports of successful hand hygiene improvement is use of a multi-modal program. Additionally, there have been several innovative technologies and products introduced in the past decade that show initial promise. The key to progress towards sustained nationwide improvement in hand hygiene compliance may lie in determining which components of a multi-modal approach are most effective, including recent innovations; in other words, a Hand Hygiene Bundle.

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BACKGROUND

Numerous studies conclude that hand hygiene reduces infection risk, including *Clostridium difficile* infection (CDI), catheter associated urinary tract infection (CAUTI), catheter related bloodstream infection (CRBSI), ventilator associated pneumonia (VAP), hospital acquired pneumonia (HAP), methicillin resistant *Staph aureus* (MRSA) and surgical site infection (SSI)³⁻⁷. However, when epidemiologists attempt to define the specific contribution of hand hygiene to HAI prevention, they “think about the complications produced by the various measurement errors, biases, and confounders and will tell you that, like all statistical relationships, this one is complicated”⁸.

There is one study however, published in 2016, where an association between hand hygiene compliance and HAI was quantified. The study reported an overall 6% reduction in HAI with a 10% improvement in hand hygiene ($p = 0.086$). For CDI specifically, a 14% infection reduction was reported subsequent to a 10% improvement in hand hygiene ($p = 0.070$)⁹.

If these estimates were to bear out nationwide, a small sustained increase in hand hygiene compliance could result in a dramatic decrease in infections, as well as the associated cost in both dollars and human suffering.

Achieving and sustaining hand hygiene compliance however, would be no small feat, given the dismal progress in the last several decades. The CDC concluded in 2002 that healthcare worker compliance with hand hygiene was no more than 40%¹⁰. And still today in 2017, the CDC reports that healthcare worker hand hygiene compliance is on average 50%¹¹.

The barriers to sustained high compliance have been detailed in numerous publications including:

- Skin damage with frequent hand hygiene¹²
- Confusing messaging to healthcare workers resulting in focus on self vs. patient protection, and uncertainty with regarding to 5 moments vs. two moments (entering and leaving patient rooms)¹³
- Touchless faucets associated with issues including contamination risk, inadequate sensor sensitivity and need for battery replacement¹⁴
- Healthcare providers might need to clean their hands as many as 100 times per 12-hour shift, depending on the number of patients and intensity of care¹⁵
- Numerous additional challenges are reported such as lack of executive support, inadequate knowledge, shortage of sanitizer/soap, glove use, etc.¹⁶

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Although the 2014 CDC National HAI Progress report notes that infection reduction progress has been made, sustained zero infections for any category of HAI has not been achieved. Consequently, the report concludes that there are significant improvement opportunities remaining, especially relative to prevention of CAUTI and CDI, where hand hygiene compliance is critical.²

DISCUSSION

How can we in healthcare, achieve and sustain high compliance with hand hygiene as the single most important action to reduce the risk of healthcare associated infections? One conclusion that can be made based on published evidence to date, is that multi-modal hand hygiene improvement programs work¹⁷. This type of approach might also be called a Bundle. There is no consensus on which modes or elements, or how many are best. However, they can be organized into four categories: Executive & Physician Support, Products, Training and Tracking. Some of the modes or measures reflected in published accounts follow, though this is not an exhaustive listing.

MODE OR BUNDLE ELEMENT	DESCRIPTION	REFERENCES
<i>Executive and Physician Support</i>		
Physician and executive champions and support	Possibly the most important factor in creating a culture of safety and social cohesion in healthcare, with can sustain good hand hygiene compliance, is visible and consistent support by local executives and physicians.	31-33
Reward Plus Punishment	Reward incentives, combined with strict personal accountability can lead to successful improvement and durability of hand hygiene compliance by leveraging dual theories of behavior change.	35,36
<i>Products</i>		
Hand hygiene products that protect skin	A variety of products designed to protect the surface of the skin and reduce bioburden are available to address skin damage reported with frequent hand cleaning by healthcare workers. These products include skin protectants, barrier creams and moisturizing lotion. When skin is healthy, there is less of a risk of avoiding hand cleaning, and fewer cracks and crevices in which pathogens can reside.	25-27
Pocket sized hand sanitizer for each staff member	The pocketsize bottle of alcohol-based sanitizer can significantly improve healthcare worker and doctors' compliance with hand hygiene.	34
Sanitizer at point of use	Hand hygiene at the point of care is recognized as a best practice for promoting compliance at the moments when hand hygiene is most critical.	37,38
<i>Training</i>		
Engaging patients in monitoring healthcare worker hand hygiene	Using patients as observers of healthcare worker hand hygiene compliance has been reported in multiple studies to be effective in boosting hand hygiene compliance rates.	21,22
Hand culturing and glow germ exercises	Using agar plates to culture hands of healthcare workers, as well as fluorescing marker product to visualize the quality of hand cleaning have both been used as successful hand hygiene educational tools.	23,24
Patient Stories	The use of patient narratives, including those regarding healthcare associated infections, are used in healthcare to motivate practice changes promoting patient safety.	28-30
Simulation/return demonstration with training	Simulation and return demonstration have been reported to help improve retention of learned skills including the steps recommended for hand sanitizing and washing.	39-41
Visual Reminders with our without featuring facility specific staff and physicians (posters, screen savers, buttons, videos, etc.)	Visual reminders have been shown to improve hand hygiene compliance by increasing attention, interest and peer pressure among healthcare workers, especially when featuring photos of facility specific staff and physicians.	43,44
WHO Five Moments	Promotion of the WHO 5 moment approach to hand hygiene has been found to be effective in increasing compliance in healthcare workers.	45
<i>Tracking</i>		
Automated hand hygiene compliance monitoring systems	The automated systems have been reported to provide exponentially more measurements than direct observation, and the immediate feedback is associated with a rapid and durable improvement in hand hygiene compliance. In addition studies report that these systems have resulted in a reduction in HAI rates. Many note that these systems are very expensive and complicated to install, and compliance can return to pre-intervention levels without human intervention/interaction.	18-20
Video auditing	Video surveillance with feedback for hand hygiene has been found to be effective in measuring and increasing hand hygiene compliance.	42

INNOVATIONS IN HAND HYGIENE

In recent years there have been very few true innovations, designed to improve hand hygiene compliance. Some of the most promising follow, with referenced studies:

MODE OR BUNDLE ELEMENT	DESCRIPTION	REFERENCES
Products		
Alcohol-based hand sanitizer with added essential oils	Essential oils provide added therapeutic properties including skin healing, aromatherapy, antibacterial properties against pathogens including multi drug resistant organisms, anti-inflammatory and antioxidant properties, and anti-anxiety benefit.	46-56
Training		
Smart phone text reminders and recognition for HH	Text message reminders and feedback have been reported to enhance multimodal hand hygiene compliance programs.	68
Updated World Health Organization 6-step technique with "Fingertips First"	A new 6-step hand rub technique with "Fingertips First" showed greater efficacy than the standard technique in reducing fingertip contamination, potentially improving hand hygiene action quality.	69
Gaming and automated teaching technology	Incorporation of new automated teaching technology, including automated image analysis of fluorescence to assess quality of hand hygiene, can encourage staff participation in learning, and ultimately improve hand hygiene compliance and technique in the acute healthcare setting.	59-62
Patient Hand Hygiene	Despite increasing evidence that patients' flora and the hospital environment are the primary source of many infections, little effort has been directed toward cleaning patient hands. One study estimates only 15% of healthcare facilities include patient hand hygiene in their overall hand hygiene programs.	63-67
Tracking		
Mobile device apps to track hand hygiene compliance	Mobile apps can facilitate direct observation of compliance with the WHO five moments of hand hygiene compliance which remains the de-facto "gold standard".	57,58



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CONCLUSION

From studies on hand hygiene optimization to date, one can conclude that a successful hand hygiene program must be multi-modal, or what could be considered a Bundle. And it is a sure bet that in order to achieve and sustain good hand hygiene compliance, a critical element is executive and physician champions and support, which is the first Bundle category. Beyond that, perhaps the Bundle should include at least one mode or element from each of the remaining 3 categories: Products, Training, Tracking, including the latest innovations. Once that basic Bundle is employed, if improvement is not noted over a pre-determined time period, other(s) could be added in a phased manner until a higher, sustained level of compliance is achieved.

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