



A Systems and Behavioral Approach to Improve Hand Hygiene Practice

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ABSTRACT

Despite convincing evidence since the 1840s that improved hand hygiene reduces infection rates, studies show that healthcare worker compliance with hand hygiene is consistently sub-optimal in many healthcare settings. Optimal hand hygiene is a critical component in any process focused on achieving and sustaining zero incidents of healthcare-associated infections (HAIs). Pennsylvania hospitals and nursing homes have reported a slow but steady decline in HAIs through the National Healthcare Safety Network and the Pennsylvania Patient Safety Reporting System. Reliance on current methods to detect hand hygiene compliance—such as direct observation, hand hygiene product use measurement, and electronic monitoring—has been problematic. Implementation of a credible hand hygiene program can be enhanced by integration of systems supporting hand hygiene activities with an understanding of workflow and human behavior. Healthcare facilities may improve hand hygiene practice by applying a multimodal framework of system and behavioral strategies to investigate, understand, and mitigate gaps in infrastructure and behavioral components of hand hygiene. (Pa Patient Saf Advis 2014 Dec;11[4]:163-7.)

INTRODUCTION

Considerable efforts are being made to reduce healthcare-associated infections (HAIs) in Pennsylvania healthcare facilities.¹ According to the Pennsylvania Department of Health, the incidence of HAIs in Pennsylvania hospitals has declined substantially since the passage of Act 52 in 2007. However, the Pennsylvania Department of Health also reported that dramatic improvements in the incidence of hospital HAIs have slowed, and in some cases, improvement regressed slightly from 2011 to 2012.² From 2010—the first full year of nursing home reporting to the Pennsylvania Patient Safety Reporting System (PA-PSRS)—through 2013, there has been improvement in the HAI incidence of most nursing homes. However, in this same time period, the incidence of *Clostridium difficile*-associated diarrhea was unchanged and the reporting of influenza-like illnesses increased.¹

Since Semmelweis discovered in the 1840s that handwashing prevented deaths from puerperal sepsis, studies have continued to show convincing evidence that improved hand hygiene reduces infection rates.^{3,4} Good hand hygiene is recognized as the single most important method for preventing HAIs.⁵ Professional and regulatory agencies expect infection control programs to emphasize healthcare worker adherence to hand hygiene practices.^{6,8} Hand hygiene practice standards have been embraced by the Centers for Disease Control and Prevention, the World Health Organization (WHO), the Joint Commission, the Society for Healthcare Epidemiology of America, and other expert organizations.^{5,9,11}

Despite professional and regulatory guidance, healthcare worker compliance with hand hygiene is consistently suboptimal in many healthcare settings. For example, a 2010 systematic review of hand hygiene compliance studies found a dismal overall compliance rate of 40%.¹² It remains critical for healthcare facilities to optimize basic hand hygiene as they strive for zero HAI incidents. Current regulations and guidelines provide few practical strategies to successfully motivate clinicians to improve hand hygiene practices at the bedside.⁹ The inconsistency and lack of sustainability of methods to motivate healthcare worker compliance suggests that hand hygiene behavior is complex. However, implementation of a credible hand hygiene program can be enhanced by use of systems that address healthcare delivery workflow and human behavior.¹³

HAND HYGIENE COMPLIANCE IN PENNSYLVANIA

Pennsylvania Patient Safety Authority analysts queried the PA-PSRS database for events associated with hand hygiene for the 10-year period of June 2004 through June 2014; the query returned 789 event reports. Analysts reviewed the reports to identify those associated with compliance. Pennsylvania healthcare facilities reported 35 events related to hand hygiene compliance. A sampling of these reports included the following:

- Handwashing was not performed before or after a postoperative dressing change procedure, and no gloves were worn for a dressing change.
- A surgeon did not do a surgical scrub before gowning for the first case, then used foam soap before scrubbing for the second case and touched drapes on the sterile table without being sterile.
- An x-ray tech ignored isolation precautions by not wearing gloves or sanitizing their hands after touching the patient.



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- A nurse did not attempt to clean their hands or wear gloves while accessing a cancer patient’s port, leaving the room twice and not performing hand hygiene or using clean gloves either time.
- An anesthesia provider suctioned a patient’s airway without gloves, wiped his hands on his jacket, and administered intravenous medication without hand hygiene or gloves. The nurse offered him hand sanitizer prior to medication administration, but the physician refused.
- A nurse inserted a rectal suppository in a patient and then performed a blood draw without washing their hands between procedures.

EFFECTIVENESS OF CURRENT HAND HYGIENE METHODS

Alcohol-Based Handrubs

The widespread provision of alcohol-based handrubs (ABHRs) has been shown to improve hand hygiene compliance. ABHRs improve the availability of the product at the point of care, shorten the time necessary to clean hands, and decrease skin irritability with emollient-enriched formulas.^{5,9} Alcohol solutions containing 60% to 95% alcohol are the most effective hand hygiene antimicrobials, with the exception of effectiveness against *Clostridium difficile*, which requires soap and water handwashing to remove spores.⁵ Kendall et al. cite multiple studies from 2002 to 2012 demonstrating improvement in hand hygiene and decreases in HAI rates with implementation of point-of-care ABHR dispensers.¹⁴ Despite this improvement, a 12-month multicenter collaboration focused on ABHRs demonstrated that overall hand hygiene adherence remains low across the country.^{12,15}

Compliance Monitoring

Current methods to detect compliance include direct observation, product measurement, and electronic monitoring. However, reliance on these methods

is problematic because of observer bias, expense, method validity, practicality, and lack of sustainable, effective strategies to use the outcomes to change clinician behavior.⁹ Reliance on these methods has proved ineffective in hardwiring optimal hand hygiene behaviors.

Direct observation. This is the gold standard for assessing hand hygiene compliance, but it is labor-intensive and subject to method variation. Observer bias, the Hawthorne effect, and technical challenges may result in overlooking incidents of contamination before and during the patient encounter.⁹

Product measurement. An increase in the use of product does not verify technique or compliance with the WHO Five Moments for Hand Hygiene.⁹ See “WHO Five Moments for Hand Hygiene” for more information.

Electronic monitoring. Recent technologies have been developed with room entry and wearable motion sensor components that record hand hygiene opportunities, detect when hand hygiene dispensers are accessed, and/or use lights, vibration, or audible alerts to prompt healthcare workers to perform hand hygiene. Electronic

monitoring eliminates observer bias but does not validate technique or compliance with performance of hand hygiene opportunities at the WHO moments 2, 3, and 5.⁹ Electronic monitoring is subject to technical challenges and may require financial investment and ongoing maintenance. In contrast to room entry and motion sensor methods of monitoring, a recent study in two South Carolina hospitals demonstrated that observation via a 24-hour video monitoring system can be used to validate performance of all of the WHO Five Moments for Hand Hygiene.¹⁶

CLOSING THE HAND HYGIENE PRACTICE GAP

Rather than relying on measuring compliance or purchasing new products, it may be more effective to focus available resources on implementation of systems that address healthcare delivery workflow and human behavior.¹⁷ Current research demonstrates that no single intervention can change long-standing patterns of behavior.¹⁸ A multimodal approach has emerged as the best sustainable method to improving hand hygiene compliance. This approach consists of instituting a structured framework of strategies for

WHO FIVE MOMENTS FOR HAND HYGIENE

According to the World Health Organization (WHO), the five moments for hand hygiene that will most effectively interrupt microbial transmission during patient care are as follows:

1. Before touching a patient: protects patients from harmful organisms on healthcare workers’ hands
2. Before clean/aseptic procedures: protects patients from harmful organisms on themselves or the healthcare worker
3. After body fluid exposure risk: protects the healthcare worker and the environment from the patient’s harmful organisms
4. After touching a patient: protects the healthcare worker and the environment from the patient’s harmful organisms
5. After touching patient surroundings: protects the healthcare worker and the environment from the patient’s harmful organisms

Source: World Health Organization. Five moments for hand hygiene [online]. [cited 2014 Nov 3]. http://www.who.int/gpsc/tools/Five_moments/en

hand hygiene compliance with the additional focus on the internal and external determinants of behavior changes.^{11,19} A tool to facilitate mapping strategies to specific staff beliefs and behaviors, entitled Decision-Making Map to Improve Hand Hygiene Behavior, is available on the Authority's website at <http://patient.safetyauthority.org/EducationalTools/PatientSafetyTools/Pages/home.aspx>.

COMPONENTS OF A MULTIMODAL APPROACH

Assess Barriers to Hand Hygiene

A robust hand hygiene improvement program begins with assessment of barriers to optimal practice. A facility-specific assessment targets hand hygiene systems problems, workplace reminders, safety climate, training, evaluation, and feedback on resources, knowledge, compliance, and leadership. A sample of a barrier assessment, Hand Hygiene Self-Assessment Framework 2010, is available on the WHO website at http://www.who.int/gpsc/country_work/hhsa_framework.pdf.

Survey Hand Hygiene Behaviors and Beliefs

It is critical to assess healthcare workers' beliefs about hand hygiene to target internal motivators (such as attitude, social norms, perceived control, and intentions) and external motivators (such as the activity level in the work setting and the location of hand hygiene stations). An example of a behavior belief survey, the Perception Survey for Health-Care Workers, is available on the WHO website at http://www.who.int/gpsc/5may/tools/evaluation_feedback/en.

Institute a Hand Hygiene "Bundle"

Key components of a bundle of hand hygiene interventions include the following:¹⁸

- Integrate administrative and leadership support with the healthcare facility quality improvement effort.

- Institute a multidisciplinary team to coordinate implementation.
- Determine the effectiveness of preventive strategies with ongoing monitoring and timely feedback about HAI rates and hand hygiene compliance.
- Implement methods to reinforce behavior and accountability, including education, reminders, and support for appropriate hand hygiene behavior.

These components are consistent with the WHO key elements of a hand hygiene program, which include system changes and strategies to ensure available resources, training, monitoring, performance feedback, workplace reminders, and institution of a safety climate.¹¹

Map Specific Strategies for Hand Hygiene Compliance to Behaviors

Valuable strategies to improve hand hygiene behaviors correlate with individual beliefs that influence the intention to perform hand hygiene.²¹ The behavioral determinants of intention include the following:

- The person believes that hand hygiene at the point of care prevents the spread of organisms and patient harm from HAIs.
- The person believes that hand hygiene compliance is expected and valued by peers, supervisors, and patients.
- The person believes that they have control over the resources necessary to comply with hand hygiene and can remove barriers to performance.

The results of a behavior, belief, and/or barrier assessment will indicate which motivators need to be targeted. Studies have shown that mapping specific interventions to these internal and external motivators of behavior can increase healthcare worker hand hygiene performance. Multiple strategies to address these

behavioral motivators have been documented in the literature.^{13,18,20,22}

Strategies to enhance staff behavior beliefs that hand hygiene prevents HAIs include the following:¹⁴

- Explain the rationale and science behind the WHO Five Moments for Hand Hygiene.
- Require that a clinical role model provide hand hygiene education that is specific to the various staff members' job tasks.
- Use visual aids, such as a fluorescent marker to demonstrate organism transfer.
- Define administrative goals and targets for hand hygiene for all staff.
- Institute persuasive communication moments, such as one-to-one point-of-care conversations by leadership on the value of proper hand hygiene.
- Post intranet screensavers and various changeable visual reminders by the sinks, mirrors, doors, or charts.
- Provide feedback, at staff meetings or group sessions, on successful hand hygiene efforts as well as episodes of patient harm from HAIs.

Strategies to enhance the belief that hand hygiene compliance is valued and expected by administrators, role models, peers, and patients include the following:¹³

- Engage staff and physicians as active role models.
- Require a signed contract or commitment to formulated hand hygiene goals.
- Develop, distribute, and practice peer-to-peer talking points.
- Provide visible praise, encouragement, and/or material rewards in recognition of successes.
- Include hand hygiene compliance/performance evaluations in annual performance and competency evaluations.
- Make hand hygiene compliance a credentialing requirement.



- Empower patients to speak up using patient report cards.
- Have staff wear the Joint Commission’s “Ask me if I’ve washed my hands” buttons.¹⁰

Strategies to increase the person’s belief that they have control over resources for good hand hygiene performance include the following:¹³

- Ensure availability of ABHR or handwashing stations at the point of care in all patient care areas.
- Develop a system to ensure soap, ABHR stations, and towels are stocked, functional, and convenient.
- Install a touchless hand lotion dispenser in all work areas to prevent skin irritation from multiple handwashings.
- Practice integrating missed opportunities for hand hygiene into high-workload situations.
- Demonstrate methods to integrate hand hygiene into workflows and to keep up with the workload while maintaining good hand hygiene.

Intervene to Address Disruptive Behaviors

If hand hygiene compliance is not achieved after application of all of the previously mentioned strategies, closer investigation may uncover that systems or belief barriers remain. If noncompliance appears to be the result of reckless or unprofessional behavior, then an alternative approach may be necessary to manage the behavior.

A graduated intervention scale entitled the disruptive behavior pyramid has been described as an effective measure to curtail reckless hand hygiene behaviors when other methods have failed.²³ This scale focuses on four escalating interventions: (1) informal conversation for a single incident of not performing hand hygiene, (2) nonpunitive awareness interventions if a pattern of poor hand hygiene exists, (3) leader-developed action plans for persistent noncompliance with hand hygiene, and (4) if all other strategies have been exhausted and the individual has been educated and coached but noncompliance continues, corrective action to hold the healthcare worker accountable for reckless hand hygiene behavior.

CONCLUSION

Healthcare facilities may fall short of goals to improve hand hygiene compliance if that improvement is dependent solely on the availability of ABHR stations, the deployment of current monitoring methods, and compliance with regulatory and professional standards and guidelines. Implementation of a credible hand hygiene program can be enhanced by using systems that target healthcare delivery workflow with strategies that influence healthcare worker behaviors and integrate handwashing into patient care activities. Studies have shown that mapping specific interventions to internal and external motivators of behavior can improve healthcare worker hand hygiene performance. A multimodal framework of system and behavioral strategies is vital to investigate, understand, and mitigate gaps in hand hygiene compliance; remove obstacles to hand hygiene performance; and convince healthcare workers that hand hygiene compliance is valued, expected, and important.

NOTES

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PENNSYLVANIA PATIENT SAFETY ADVISORY

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