Success of a Multimodal Program to Improve Hand Hygiene Compliance

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The purpose of this article was to describe the successful implementation of a quality improvement initiative focusing on a hand hygiene program that used the multimodal interventions of tailored education, monthly feedback, and reminders. Compliance rates improved from July 2011 to December 2012 by 57.4%. Efforts are continuing to ensure program sustainability. Key words: hand hygiene, hand hygiene adherence, hand washing, infection control, professional compliance evaluation

A HEADLINE in the March 22, 1966, Look magazine stated, “Our Hospitals Are Killing Us.”1 The article cited “dirt, infection and improperly washed hands” as some of the contributors to increased morbidity and mortality for patients on the inpatient wards. Fast forward to the year 2013—nearly 47 years later—and hospitals are still grappling with health care workers’ compliance with hand hygiene.

Hand hygiene is the cornerstone of infection prevention.2,3 A plethora of studies have linked adherence to hand hygiene with reduction in hospital-acquired infections (HAIs).4 Yet, good compliance with hand hygiene is difficult to achieve and a challenge to maintain.5,6 Finding methods of successfully improving hand hygiene compliance rates have been difficult. Many efforts to improve hand hygiene compliance rates often focus on education. Yet, studies using a single intervention have been shown to be ineffective.7 Multimodal intervention programs have shown some success,8 as has the utilization of a multidisciplinary approach.9 Determining the interventions that will be successful in an organization is key to improving hand hygiene compliance rates and ultimately decreasing HAIs.

BACKGROUND

In late 2010, prompted by a Centers for Medicare & Medicaid Services visit, this 566-bed academic medical center located in the Midwest identified the need to evaluate overall organizational compliance with hand hygiene. Since previous monitoring relied only on the amount of hand sanitizer and soap used, the decision was made to use a direct observation methodology to establish a baseline for hand hygiene compliance. Nursing leadership and infection control practitioners performed a 1-week, 24 hours per day, hand hygiene observation of all inpatient...
areas for a total of 2951 observations. It was determined that the observations would be conducted using the 5 key moments of hand hygiene, as defined by the World Health Organization. These include before patient contact, before an aseptic task, after body fluid exposure risk, after patient contact, and after contact with patient surroundings. Overall compliance was 86.4%. However, it was realized that because staff knew they were being observed in preparation for the Centers for Medicare & Medicaid Services site visit, there was a strong probability of inflated compliance due to the Hawthorne effect.

Between January and June 2011, hand hygiene compliance gained significant notice among executive leaders at the organization. The decision was made both to initiate an intensive hand hygiene campaign and to repeat the hand hygiene observations in July 2011. The observations now would focus strictly on hand hygiene on room entry and room exit, rather than the 5 key moments of hand hygiene. Prior to the 1-week observation, an internal slogan and image was branded: “The Power to Stop Infections Is in Your Hands” (Figure 1).

During this 1-week observation, 116 multidisciplinary leadership staff members (including 40 physicians) performed hand hygiene observations on all inpatient units, procedure areas, and within surgical services. All were trained to measure hand hygiene on room entry and room exit in the same manner. There were 9648 observations in total during this week, and overall findings revealed a compliance rate of 63.1% (Figure 2). Additional findings during the week included:

- uncertainty among staff about when and how to perform hand hygiene;
- that room for improvement was apparent for all disciplines;
- one consistent area for improvement was performing hand hygiene before donning gloves;
- discipline-specific education was needed; and
- results for hand hygiene on room exit were better than those on room entry.

**PURPOSE**

The results from the week were disappointing and further highlighted the need for a strong hand hygiene campaign and program throughout the organization. The purpose of this quality improvement initiative was to determine whether a multimodal intervention program for hand hygiene could increase and sustain hand hygiene compliance rates within the organization.

**METHODS**

The determination was made that initial efforts would focus on the inpatient unit areas and include all levels of care (intensive care unit, intermediate, general), as well as both adult and pediatric units.

**Multimodal intervention program**

The efforts that began in August 2011 as part of a comprehensive hand hygiene program can be grouped into 3 main areas: education, feedback, and reminders. All occurred with strong leadership support and visibility, which were vital to the success of this program. The infection control committee approved the project. As this was a quality improvement project, it did not require review by the institutional review board.

**Education**

A computer-based training program was developed and required for all direct care staff
members to complete. This program of approximately 30-minute duration focused on the importance of hand hygiene, techniques of soap and water hand washing and hand sanitizer hand hygiene, and expectations from the organization on when to perform hand hygiene. A posttest ensured that important points were understood. Questions from staff about the computer-based training pointed to the need for education for specific disciplines and were context specific. Guidelines about when and how hand hygiene was to be performed (during particular workflows for a discipline) were established between a few of the frontline staff members for that discipline and an infection control practitioner. For example, guidelines were developed for when and how to perform hand hygiene (both isolation and nonisolation patients) during radiology staff workflow of taking a portable x-ray machine into a patient’s room or transporting a patient. Guidelines were also developed for the physical therapy workflow of ambulating a patient in a hallway. It was the expectation that the manager share these newly developed guidelines with all departmental staff members via e-mail and staff meetings. The infection control practitioners were also asked to attend unit and discipline staff meetings to answer staff questions about hand hygiene.

**Feedback**

One important component of the program was the use of ongoing feedback. A form that could be scanned into a database was developed and used for hand hygiene observations, and this facilitated the prompt creation of observation reports. Initially, data were shared with units via their unit scorecards, but that created delays and did not provide information to individual disciplines. Currently, information is scanned by the fourth day of the month (for the previous month), and reports are generated and e-mailed to leadership for all disciplines. In this manner, prompt results can be shared with frontline staff members who are waiting to hear how they performed. The results include
compliance data by unit and discipline and on room entry/room exit. To also highlight this important metric for the organization, the information is on the organization-wide high-level scorecard (for overall compliance), and this is presented each month at the department managers' meeting by the hospital CEO and to the governing body. The information is also posted on the organization’s intranet.

Methods of observation

Monthly observations were conducted between September 2011 and May 2012 by a small group of observers (approximately 4 student volunteers in infection control and infection control practitioners/staff). While interrater reliability was not performed, all observers were trained by the same infection control practitioner. This training consisted of reviewing 6 scenarios in which hand hygiene should be performed and required the trainee to identify the correct hand hygiene procedure for each scenario. After each trainee successfully completed these 6 scenarios, the infection control practitioner went to the inpatient units with the observer and conducted actual observations together for approximately 1 hour to ensure that there was a correct understanding of the various scenarios, as well as how to complete the hand hygiene observation form.

Despite the fact that there was consistency in the observation methodology, frontline staff would repeatedly question the data and the methodology used by the central observers, and the results from each month remained variable for each area and inpatient units overall. In June 2012, a decision was made to transition the observations from the central observers to unit/discipline-based observers. This would allow for an increased sample size from each unit and give units the ability to collect unit-specific data and eliminate the concern about “incorrect data.”

To ensure a consistent approach by all staff members who were identified by their manager to be one of the select observers, a training video was created. This video highlights 12 of the most common multidisciplinary scenarios that observers would encounter when entering and exiting a patient room and demonstrates how to complete the scannable observation form. The training video allowed staff to practice recording hand hygiene observations for these scenarios. A training video was created for the inpatient areas, and a separate training video was developed for outpatient/ambulatory areas, because the common scenarios for hand hygiene varied for these 2 areas. Observers are expected to pass a 20-question final assessment at a 100% passing rate to assess their knowledge of the hand hygiene observation and data collection process. The videos and final assessment took approximately 60 minutes to complete. Another advantage of having unit observers is that in the future we can include identification of staff on the observation form and provide individual feedback. Currently, results remain at the overall unit/discipline level. To minimize observer bias, observations were conducted concurrently by infection control staff and the unit, and the findings were compared to examine differences in compliance rates.

Another important component for feedback is for the observer to give feedback at the time of the observation. Staff comfort levels currently vary in their ability to provide real-time feedback. Some staff members are particularly reticent to provide feedback because of uncertainty with how it would be received. It is hoped that over time the comfort level will increase and more direct feedback to the individual will be provided.

Reminders

We determined that there was a strong need to continually provide reminders for staff. All reminders have included the slogan/graphic that was developed (Figure 1) to make this a recognizable campaign. The reminders have been on e-screens and note pads located throughout the facility. Labels for every hand sanitizer dispenser were created and applied to continually remind staff that “the power to stop infections is in your hands.” Posters were created featuring leadership and frontline staff from a variety of disciplines, holding
up one hand—to mimic the hand symbol on the campaign logo and “vow” to help stop the spread of infections. The poster headlines vary among the following:

I have the power to stop infections. So do you.
I have the power to save lives. So do you.
I have the power to reduce HAIs. So do you.

The posters are changed quarterly throughout inpatient units and ambulatory areas and feature a variety of frontline and ancillary staff, physicians, executive leaders, and representatives from volunteer services and the Patient and Family-Advisory Council. Information is shared on the Hand Hygiene Web page on the intranet and in various internal newsletters that target either all staff or specific disciplines.

During Employee Appreciation Week, potato races were held, and the hand hygiene leadership team created a “Germ Busters” potato that was crafted to highlight our message of the importance of hand hygiene. Most recently, a fun-spirited video was produced featuring staff and faculty throughout the organization singing about the importance of hand hygiene. The video has been featured on the intranet, on our external Web site, and in our internal e-newsletter. It has also been played at a variety of meetings, as a fun, energetic way to keep the importance of hand hygiene in front of staff and faculty. A weeklong “road show” was also held throughout the organization’s sites to showcase the video and provide education materials to staff, faculty, patients, and visitors, raising awareness of hand hygiene and the associated resources.

Leadership support

In August 2011, we determined that there was a need to establish an interdisciplinary Hand Hygiene Task Force. This group meets monthly; has representation from pharmacy, nursing, medicine, infection control, environmental services, respiratory therapy, phlebotomy, and nursing education; and has developed an overall scope and performance improvement plan that was guided by completing the World Health Organization hand hygiene survey.12 Ongoing program direction is established by this group, which is chaired by one of the infection control practitioners. In addition, in January 2012, it was determined that there was a need for a Hand Hygiene Executive Leadership Team. This team includes the chair of the task force and 2 vice presidents (quality and nursing), 1 senior vice president (nursing), 1 physician, and a member of the marketing team. This group is charged with ensuring that this topic stays at the forefront of the organization.

RESULTS

The monthly hand hygiene results have been positive and continue to trend in an upward direction. From January 2012 to December 2012, a 57.4% increase in hand hygiene compliance has been observed (Figure 2). These results are monitored closely each month and form the basis for new strategies to be implemented to keep the positive momentum. In addition to the overall compliance, the compliance data are also displayed by unit as compared with the organizational goal and shared on a monthly basis.

DISCUSSION

Our results support and extend the findings of others.13-15 A recent Cochrane review found that, while more methodologically sound study designs are needed, multifaceted campaigns with social marketing or staff involvement appear to have an effect in improving hand hygiene compliance. Education alone is unlikely to result in sustained enhancements in hand hygiene compliance.16

While direct observation remains the gold standard for monitoring hand hygiene,7 there has been a rapid proliferation of technology-based methods for increasing ease and accuracy of hand hygiene monitoring.17 We are currently evaluating the feasibility of electronic monitoring systems for the measurement of hand hygiene and plan to start a pilot in the near future to evaluate the ability to reach even higher levels of hand hygiene.
compliance with the use of automated monitoring technology. This technology includes a badge worn by health care providers, and the use of soap or alcohol gel is monitored on patient room entry and exit. We also know that our work is not done—the need for ongoing attention in the form of education, feedback, and reminders—those interventions responsible for our improvements will be essential to maintain and improve our results.

**Limitations**

This quality improvement project has limitations. First, as this was not a controlled trial, a direct causal link between our campaign and hand hygiene rates is not possible to establish with certainty. However, the temporal relationship of our interventions and the rise in hand hygiene rates supports our hypothesis that multifaceted interventions lead to increased hand hygiene compliance. Second, as many interventions were implemented concurrently, it is not possible to establish the independent effect of any one intervention on hand hygiene. Third, the Hawthorne effect may have led to initial increases in hand hygiene, whereby health care workers are likely to modify their behavior (ie, do more hand hygiene) because they realize they are being observed. The fact that our hand hygiene rates remain high over the follow-up period suggests that while the Hawthorne effect may play a role, it is not the sole mechanism for improvement. Finally, our interventions were confined to the inpatient setting. Future studies will examine implementation of hand hygiene campaigns in the ambulatory setting.

**CONCLUSION**

In conclusion, hand hygiene is the cornerstone of infection prevention. A large-scale, multifaceted approach is useful for achieving better compliance with hand hygiene. Larger, well-designed studies are needed to examine interventions to promote and enable hand hygiene by health care workers.

**REFERENCES**


