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Brief report

A successful multifaceted strategy to improve hand hygiene compliance rates

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Health care–acquired infections are a major contributor of mortality; therefore, prevention of these infections is a priority. Hand hygiene compliance among health care workers is low. We report the process at our institution to increase the hand hygiene compliance rate (HHCR).We implemented interventions over 6 months. The periods were divided into preintervention, intervention, and postintervention, and the monthly HHCR was calculated. The primary objective was to measure the HHCR after the intervention period and ensure sustainability. There were 25,372 observations, with 22,501 compliant events, for an overall HHCR of 88.7%. The HHCR improved over time (preintervention, 72.7%; invention, 79.7%; postintervention, 93.2%), with significance between pre-and postintervention periods ($P < .002$). The HHCR stabilized after all interventions and was sustained over 22 months. Our study highlights a multifaceted intervention, including administrative leadership, that led to an increase in the HHCR. Institutions should individualize their multimodal approach to include administrative leadership to achieve a high, sustained HHCR.

Health care–acquired infections are a major contributor to morbidity and mortality in the United States; therefore, the prevention of these infections is a top priority for the U.S. Department of Health and Human Services.[1] Hand hygiene (HH) is a leading measure to prevent cross-transmission of microorganisms and to reduce the incidence of health care–associated infections.[2,3] Despite evidence that good HH practices improve patient safety, compliance among health care workers (HCW) is <50%.[2,3] The World Health Organization has evidence-based guidelines to improve HH practices for all HCWs. The concept of My 5 Moments for Hand Hygiene that is integrated in the World Health Organization guidelines includes HH before touching a patient, before a clean-aseptic procedure, after body fluid exposure, after touching a patient, and after touching patient surroundings. Poor HH adherence jeopardizes patient safety; therefore, interventions to improve hand hygiene compliance rates (HHCRs) must be a priority of hospitals.

As part of a quality improvement process, the administrative leadership of our institution created a multidisciplinary HH task force to increase HH compliance among HCWs. The task force was led by the chairman of medicine and included a multidisciplinary group of infection control practitioners, infectious diseases physicians, marketing team members, and leaders in nursing, transportation, nutrition, respiratory therapy, and engineering and safety. The objective of this task force was to increase the HHCR based on published literature of interventions that were successful.[4-6] The task force selected 5 interventions to improve the HHCR, including increasing the number of hand alcohol dispensers in hospital units, using covert observers (secret shoppers) to evaluate compliance of HH, using visual cues of hand dispensers that were empty or nonfunctional, using letters from the chief medical officer to noncompliant HCWs, and using positive recognition and reinforcement of departments with excellence in HHCRs (Table 1).

We report our multifaceted bundle strategy implemented over time and compare the HHCR prior, during, and after all elements of

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Table 1
Intervention measure, goals for implementation, and timeline

Intervention measure	Goals for implementation	Timeline for the intervention
1. Addition of hand gel dispensers to the hospital units	Increase access of ABHR	October 2011-January 2012
2. Establishing a covert observer program—secret shoppers	To estimate the HHCR by unbiased covert observers	January 2012- gradual scale-up to include all hospital units
3. Placement of red flags on ABHR	Provide visual clues to service ABHR devices, and increase access to functional ABHRs	February 2012
4. Letters from CMO to noncompliant HCWs	Hold HCW accountable for their HH practices, and increase awareness of supervisors in practices of staff	March-April 2012
5. Awarding trophies to exceptional units	Institutional recognition of HCWs with exceptional HH practices, improve morale, and establish excellence goal	July 2012

ABHR, alcohol-based hand rub; *CMO*, chief medical officer; *HCW*, health care worker; *HH*, hand hygiene; *HHCR*, hand hygiene compliance rate.

the strategy were applied. The sustained success of this multidimensional HH strategy was the high-level commitment of administrative leadership by leading the task force and making it an institutional priority.

METHODS

Scott and White Memorial Hospital is a 636-bed, teaching, referral hospital in Central Texas. HH interventions were implemented sequentially from October 2011-July 2012. The study time periods were divided into preintervention (January-September 2011), intervention (October 2011-July 2012), and postintervention periods (August 2012-May 2014). Monthly HHCR data were collected from January 2011-May 2014.

The quality council under the direction of the board of trustees of the health care system created a task force to promote HH interventions. The task force included physicians and members from infection control, marketing, engineering and safety, transportation, nursing, and respiratory therapy. The organizational structure for the task force was a collective leadership with equal value placed on members' input and shared responsibility. In this model, the chair of the task force acted mainly as a liaison with the leadership of the institution and presented all of the information to quality council and the board of trustees. The other role of the chair was to be supportive and create the conditions for openness and promote implementation of recommendations.[7,8] The task force adopted an integrated multimodal approach,[9] with emphasis on education of caregivers, use of evidence-based effective strategies, well-defined attempts to change the behavioral characteristics of the system, and well-defined attempts to make HH products conveniently available. The interventions that were implemented (Table 1) included education and training; promotion; use of visual cues on the gel dispensers to indicate malfunction or empty and placement of dispensers in high-traffic areas; visual cues in examining room reminding providers, patients, and families about the importance of HH; covert direct observation of HH by peers; rewards to the teams with highest compliance presented in hospital-wide meetings; alerts to the immediate supervisor via letters when health care provider did not comply; and regular reports to leadership, including the chief medical officer, chief nursing officer, chair caucus (all of the chairs of the different clinical departments), and board of trustees.[10-13] The monthly summary report of HHCRs was distributed to all providers within the institution for transparency in HHCRs. Monthly meetings were held with the members of the task force to review all evidence-based guidelines in HH and to discuss the necessary changes that needed to be made. The task force focused on identifying barriers that existed, and the monthly meetings revealed insights into how these potential barriers may be addressed with new interventions.

The measure of compliance was direct observation of HH measures by covert observers, secret shoppers. These observers were members of the staff in the outpatient clinics and inpatient units who received standardize training by the infection control personnel and had to submit 40 observations per month (average of 1-2 observations per day) for their specific unit. The secret shoppers documented direct observed HH practice prior to entry into a room or patient contact of all hospital staff members. The time period to conduct these observations was a self-determined period by the secret shopper based on other duties. They obtained names by discrete visualization of name badges, the departments that they worked, and their discipline to enter into an electronic database. If they were unable to obtain this information or unable to complete the forms, the entry was still used for analysis purposes, but no specific letter was sent to noncomplaint HCWs or managers. There were attempts to identify the individual through their respective divisions based on time and location of the incident to have complete data. The identity of the secret shoppers was preserved, and only the nurse supervisor knew their role. When a HCW was noncompliant, a letter was sent to that individual and their immediate supervisor. The letter included a request to review educational material by the HCW on HH and the completion of that task to be verified by the supervisor.

STATISTICAL ANALYSIS

Monthly estimates of HH compliance and their respective 95% confidence intervals (CIs) were calculated. A linear spline model was used to evaluate the impact of the multimodal HH intervention over time. Changes in temporal trends were assessed after the initiation of the first intervention in October 2011 (ie, addition of hand gel dispensers at month 10) and after all 5 interventions were implemented in July 2012 (ie, after the last intervention of trophies awarded to exceptional units at month 19). To address heteroskedasticity, robust SEMs were calculated and used to estimate 95% CIs for model coefficients in the spline model with 2 knots, or places where polynomial pieces connect (located at month 10 and month 19). Analyses were performed using R version 2.15.1 (The R Foundation for Statistical Computing, Vienna Austria), assuming a type I error of $\alpha = .05$.

RESULTS

There were a total of 25,372 observations during the study period, with 22,501 compliant events, for an overall rate of 88.7% during the study period. The HHCR improved over time with implementation of HH measures. Preintervention HHCRs were 72.7%, HHCRs were 79.7% during the intervention period, and HHCRs were 93.2% during the postintervention period. A significant