



# Hand Hygiene Project: Best Practices from Hospitals Participating in the Joint Commission Center for Transforming Healthcare Project

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### **For Additional Information**

Maulik S. Joshi, DrPH

Senior Vice President of Research, American Hospital Association

(312) 422-2622

[mjoshi@aha.org](mailto:mjoshi@aha.org)

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## Hand Hygiene: Best Practices from Hospitals

Hand hygiene was chosen by eight leading hospitals for the first Robust Process Improvement (RPI) project by the [Joint Commission Center for Transforming Healthcare](#). The Joint Commission had surveyed the hospitals and asked, “What is the number one patient safety challenge?” Hospitals prioritized the challenges, and hand hygiene ranked first on the survey.

Many health care-associated infections (HAIs) are transmitted by health care personnel, and hand hygiene is a primary means to reduce these infections. In 2002, the estimated number of HAIs in U.S. hospitals was approximately 1.7 million, with more than 98,000 deaths annually, [according to the CDC](#).

### The Eight Participating Hospitals

Mark Chassin, MD, Joint Commission president, chose the eight hospitals to participate in the hand hygiene project. These hospitals all had “well-established RPI infrastructure at their hospital,” said Melody Dickerson, RPI black belt, the Joint Commission. All eight hospitals use Lean Six Sigma methodologies, and it was a requirement that the eight hospitals follow the same methodology throughout the project.

The Joint Commission standard for hand hygiene has changed as a result of the hand hygiene project. Previously the standard called for hospitals to demonstrate hand hygiene compliance at a rate greater than 90 percent. A hospital that failed to comply would receive a Requirement for Improvement (RFI) and have 90 days to show improvement to 90 percent. “Because of this project, we now know how difficult it is to reach 80 percent, let alone 90 percent,” said Dickerson. “Now the standard says the hospital needs to work to improve compliance,” she explained.

The eight hospitals are:

- [Cedars-Sinai Medical Center](#), California: 950 beds, teaching
- [Exempla Lutheran Medical Center](#), Colorado: 400 beds, nonteaching
- [Froedtert Hospital](#), Wisconsin: 486 beds, teaching
- [The Johns Hopkins Hospital](#), Maryland: 1,041 beds, teaching
- [Memorial Hermann The Woodlands](#), Texas: 252 beds, nonteaching
- [Trinity Health-St. Joseph Mercy Health System](#), Michigan: 537 beds, teaching
- [Virtua](#), New Jersey: 270 beds, nonteaching
- [Wake Forest University Baptist Medical Center](#), North Carolina: 872 beds, teaching

In December 2008 representatives from these hospitals met to work on a charter and define the scope of the project, which is the first step in the five-step Six Sigma methodology: *define, measure, analyze, improve, control*. Most of the hospitals had tried tackling hand hygiene before participating in the Center’s project. For the participating hospitals—and for most hospitals beginning a similar project—the baseline data results, using non-biased hand hygiene observers or secret shoppers, were surprising in that the hand hygiene compliance demonstrated was much less than previously thought. Most hospitals thought their compliance rate was about 70 percent to 90 percent, when it was actually less than 50 percent. As one hospital champion observed, “Where we thought we were and where we were, were two different things.”

From April 2008 through August 2010, the participating hospitals defined and measured hand hygiene, analyzed data, and improved processes and workflow using Lean Six Sigma. The hospitals helped identify

15 major root causes of failure to clean hands and worked on developing targeted solutions for each root cause or contributing factor.

## Results

- As of August 2010, all eight participating hospitals reported hand hygiene compliance rates at about 82 percent, and they are still monitoring the process to determine sustainability of their results.
- Many of the hospitals have reported a decline in HAIs as their hand hygiene compliance rate has increased.
- Solutions developed by the hospitals are part of the Targeted Solutions Tool™ (TST), a web-based tool provided free to Joint Commission-accredited organizations. The TST allows organizations to customize solutions to address their specific barriers to excellent performance.

## Defining and Measuring Hand Hygiene

One of the first steps in this project was defining hand hygiene compliance. Hand hygiene was defined as washing (or cleaning) hands with an alcohol-based foam or gel or soap upon entry and exit of a patient care area or environment.

Data collection—particularly *how* data was collected—was critical to the project. Hospital managers realize if people know they are being monitored, they will adjust their behavior accordingly. Most hospital hand hygiene teams decided it was important to have secret observers collecting baseline data. According to Dickerson, most organizations will find it easy to gather hand hygiene data using the TST since it provides the user with the data collection tool, data entry programming, self-supported observer training module and real-time reporting of compliance rates complete with charts that can be downloaded and printed for display.

In this project, information was gathered by using hand hygiene observers and just-in-time coaches. Rather than just collecting compliance information, the hand hygiene observers collect data on the observed factors that can lead to hand hygiene non-compliance such as health care personnel entering a room with their hands full of supplies. The just-in-time coaches begin data collection two weeks after the observers have begun collecting compliance data, since this effort can be considered a form of intervention. Coaches approach the health care worker when a non-compliant event occurs to gather non-observed factors of hand hygiene failures such as the perception of the health care workers that hand hygiene was not required or that they were distracted. Just-in-time coaching data is kept separate from the compliance data since staff members can become familiar with people in a coaching role, which could skew the data. The observed and non-observed factors information is what provides the information needed to generate targeted solutions.

Although any staff member in an organization could be trained to be a hand hygiene observer, members of the leadership team are encouraged to participate as just-in-time coaches. Staff members should be trained as hand hygiene observers using the TST's education module. They also should hold job positions that call for them working in the area they are observing for some period of time during the day or night. Leadership team members who could serve as just-in-time coaches include charge nurses, fellows and preceptors as well as medical directors, unit managers and respiratory supervisors. Ultimately, a hospital's goal is to engage all staff to do just-in-time coaching, which will lead to sustained improvements.

Additionally, some barriers to hand washing are things not noticed by the person who failed to wash their hands. Just-in-time coaching can help capture the root causes of failure to wash hands. If personnel

failed to wash their hands, coaches ask why and help identify observed contributing factors. Just-in-time data was kept separate from baseline observational data. Staff members can become familiar with people in a coaching role, which could skew the data.

### **Analyzing Data**

Data analysis identified root causes and also pinpointed particular groups that struggled with the problem more than others. Many of the root causes were surprising because they weren't thought to be an issue. For example, dietary workers have their hands full while delivering trays of food and may think they do not need to wash their hands since they are not touching the patient. But these health care personnel are touching the patient environment. Rethinking and standardizing the work processes allowed the workers to complete the task while minimizing the number of times they would need to wash their hands but still perform the task as efficiently as possible.

Another surprising example was at Cedars-Sinai Medical Center. The surveillance team cultured everything in the patient environment and discovered that privacy curtains—required around all patient beds in California—were colonized with multi-drug resistant organisms in some rooms. According to chief medical officer Michael Langberg, MD, the information “stunned” them. “Patients in the room did not have infections, but the organisms were sitting on the privacy curtains,” he said. Even if health care personnel were doing effective hand hygiene before walking in the room, they might touch the curtains without realizing it. The hospital swapped out every curtain and changed how and when they cleaned them. Subsequently, zero such organisms have grown on the curtains, said Langberg. This hospital also addressed the potential spread of germs on lab coats by adding hooks outside patient rooms, which allows health care personnel to easily remove their coats before entering a room.

### **Improving Processes and Workflow with Lean Six Sigma**

All participating hospitals used Lean Six Sigma methodology to examine processes and workflow of health care personnel and identify targeted solutions. A main objective was helping health care personnel incorporate hand washing in their routines, so it would be automatic and not a separate task they would forget to do.

Like most of the other participating hospitals, Exempla Lutheran Medical Center had used Lean Six Sigma for improvement processes for years but not for infection control issues, according to Amber Miller, RN, infection prevention manager. Miller explained that previous hand hygiene projects at Exempla Lutheran and other hospitals focused on posters and glow powder. “We taught people more how to wash hands than how to incorporate washing hands in the workflow,” she observed. “With Lean and Six Sigma, we created a standardized work plan so that we do the same thing every time and eliminate waste.” The team visited every unit and department to talk about each staff member's role in hand hygiene compliance and when they do hand hygiene within their particular tasks—room cleaning processes, food delivery, changing a light bulb, etc.

By bundling supplies and tasks, health care personnel have fewer opportunities to be in patient rooms and fewer opportunities when they need to wash their hands, likely increasing compliance. “We looked at workflow and how to standardize it, so we decreased ins and outs of patient rooms,” said Miller. Changing the location of dispensers to fit in people's workflow also increased compliance.

Using Lean Six Sigma methodology “helped focus our work,” said Katy Hoffman, RN, St. Joseph Mercy Health System (SJMHS) nurse manager. “If we didn't have assistance, we would have gone in a million different directions.” Russell Olmsted, epidemiologist with infection prevention and control services,

agreed: “Using Six Sigma gave us a process or framework to address initiatives. It was data-driven and gave us data for action.”

At Memorial Hermann The Woodlands, the hand hygiene team comprised of directors and managers from nursing units and ancillary departments held a brainstorming session to list every possible issue they could think of involving hand hygiene, said Tricia Kingdon, Six Sigma black belt. After the team prioritized factors using a cause-and-effect matrix, data was collected on seven issues thought to have the most impact on hand hygiene compliance, including workers having items in hand, wearing gloves and not touching the patient.

One process that Memorial Hermann focused on was arterial blood gas draw. Previously, respiratory therapists were assigned specific patients and drew the specimen, went to the lab with gloves in hand, left the specimen, re-gloved and then went to another patient’s room to draw a specimen and repeat the process. Some therapists washed their hands and some didn’t. To understand and refine the process, “we were physically standing in the ICU and role playing to follow the process,” said Kingdon. The process was streamlined by designating one person to draw the specimen and exit the patient room with gloves on and specimen in hand. That person hands off the specimen to someone already in the gas lab wearing the appropriate protective equipment. The person who drew the specimen then cleans hands and immediately goes into the next patient room. “We did not add staff. The staff now follows a different process. Instead of two separate therapists going in and out of rooms collecting specimens, one therapist draws the specimen while the other therapist runs the tests,” said Rob Varro, supervisor, respiratory services, noting the more efficient process for respiratory units.

Kingdon, like many others involved in the project, marveled at how many times nurses cross the threshold of a room in an 8- to 12-hour shift. “We’re asking nurses to wash their hands 200 times a day,” said William Parks, MD, chief medical officer at Memorial Hermann The Woodlands. “Nurses probably cross the threshold an excess of 170 times a day.” Robert Sheretz, MD, epidemiologist, Wake Forest University Baptist Medical Center (WFUBMC), said calculations suggest that nurses are required to wash their hands more than two hours per shift, if one hand-washing event equals 15 seconds.

Examining the workflow process has made people more efficient, observed Kingdon. They now ask themselves, “What do I need before I go into this room?” so they do not go in and out of patient rooms unnecessarily, she added. Anne Tyner, RN, nursing clinical systems (NCS) project specialist at WFUBMC, concurred: “Some of the challenges we had were work processes that led to an increased number of hand hygiene events. The higher number of events, the more likely someone will make an error. It is important to make things as logical as possible to get the task done, whether it involves placement of the dispenser or workflow processes or equipment.”

At Virtua, streamlining workflow meant putting hand hygiene items in one place. “You don’t have to think, where are gloves, trash, and hand gel,” said Gina Cavalli, RN, nursing director. “They are in the same place in every room.” Working with environmental services and transport staff, “we walked their process and asked, ‘Where is the best place for a gel dispenser?’ ” Food service people and phlebotomists have a container with hand gel on their carts, which works best for them, Cavalli added.

### **Using Technology**

Four of the eight participating hospitals used technology to monitor hand hygiene compliance. Typically, health care personnel wear an infrared (IR) badge that has an IR signal. With this type of device, when the provider washes his or her hands, a light on the dispenser flashes and records, “Badge X is next to this sensor.” For a unit like Nelson 8 at the Johns Hopkins Hospital, technology will help locate staff as

they care for patients on the unit. Unlike an ICU where the physicians remain on the unit, Nelson 8 has “many multidisciplinary groups coming and going every day,” said Laura Winner, RN, Lean Sigma director. The 28-bed surgical unit provides care to orthopaedic, trauma and spine patients with an average length of stay of about three days. The patient turnover on the unit is high, and workflow is busy. The unit is currently testing RIFD badges and asset tracking. That same technology is being tested in the Johns Hopkins simulation center to determine its reliability in measuring hand hygiene performance. In the near future, this technology may provide real-time hand hygiene feedback to individuals.

Since June 2010, Virtua has been piloting technology and sensors worn by all health care providers. “Technology is making us look at our process,” said Kate Gillespie, RN, Six Sigma black belt. Though the hospital is still fine-tuning that technology, Gillespie believes that in the long term, using technology will be helpful. “We cannot sustain secret observers,” she said. But having the technology has shown them their observations were “not that far off.” “We can see a correlation,” she added.

WFUBMC also focused on using an electronic method to monitor and increase compliance for hand hygiene. Health care personnel wear a real time location system tag equipped with infrared recognition that is activated when entering a patient care area. The tracker on the hand sanitizers, sinks, or pumps reads the tag and reports the activation. Tony Oliphant, RN, nurse manager, emphasized that the goal for the technology is that it does not interfere with the workflow. The badges are being modified so as not to hinder work. “We didn’t want to change the way people enter and exit rooms,” Oliphant said.

The new technology and its possibilities are “monumental in nature,” said Shayn Martin, MD, WFUBMC. “We are creating a system to track providers to perform hand hygiene on a scale that is substantially greater than our existing systems. It is continuous. It allows us to build reports for individual compliance.” He added, “We should be 100 percent compliant with hand hygiene. We want to be sure the system is highly accurate, does not give false data and does not impose on workflow.” Though using this technology “sounds big brother-like,” Martin acknowledged, “the last thing we want is to create an environment that makes people nervous and makes it harder to do their job....[The technology] is a way to approach 100 percent [compliance].”

### **Linking Hand Hygiene Compliance to Reducing HAIs**

Studies show that an increase in hand-washing compliance can be correlated to a decrease in health care-associated infections. Though it is difficult to link a reduction in HAIs directly to improved hand hygiene compliance, many of the participating hospitals have seen a decline in HAIs as their hand hygiene rate of compliance increased.

One hospital had seen a “plethora of infections that we did epidemiology on and found were linked” to hand hygiene and acquired in the hospital. At the time, hand hygiene compliance was low. “In health care, everyone is there for the health of people. To have a bad outcome that could have been linked to hand hygiene was an ‘eye opener,’ ” said an infection control team member. As hand hygiene compliance increased, the infection cluster went away.

Parks from Memorial Hermann The Woodlands, pointed out, “Hand hygiene is one multifactorial component in decreasing HAIs. It is not going to be any single thing.” Nevertheless, a driving force behind Memorial Hermann’s hand hygiene policy was being “alarmed” at the number of infections that could potentially be transmitted to patients. According to Parks, the hospital has decreased ventilator-associated pneumonia and other infections and is “working diligently” to decrease MRSA and *C.difficile* in the ICU. At WFUBMC, the medical/surgical pilot unit has had no HAIs for the past five of six months.

## Main Causes of Failure to Clean Hands

The following ten root causes were observed across the eight participating hospitals.

- Ineffective placement of dispensers or sinks
- Hand hygiene compliance data are not collected or reported accurately or frequently
- Lack of accountability and just-in-time coaching
- Safety culture does not stress hand hygiene at all levels
- Ineffective or insufficient education
- Hands full
- Wearing gloves interferes with process
- Perception that hand hygiene is not needed if wearing gloves
- Health care workers forget
- Distractions

### ***Ineffective placement of dispensers or sinks***

At Virtua, a big “aha” moment was discovering their dispensers were not standardized or visible, said Gillespie. “Sometimes dispensers were not even filled,” she added. The hospital changed the type of dispensers and their location and painted walls to make them more visible and less likely to fade in the background. These simple changes increased compliance.

Froedtert Hospital made sure dispensers were placed in the workflow, and located them right at the patient’s door for use by health care personnel when entering and exiting. “We also put dispensers in high-touch places in the unit, by telephones in the hallway, by elevators, and by other high-touch objects,” said Beth Lanham, RN, Lean Six Sigma director at Froedtert. The hospital also added more dispensers throughout the unit for staff to use.

Memorial Hermann The Woodlands has more than a thousand mounted dispensers, located inside and outside every room, and automatic dispensers by elevators. “If you don’t make it convenient right there at that second, no one is going to go around the corner and wash their hands,” said Parks, the chief medical officer. “It must be available in the flow of what the employee is doing.” The hospital has experimented with automatic dispensers and dispensers that can be operated with one hand. Explaining that you “have to go through the micro of this before you can get to the macro,” Parks said the hospital is modifying their dispensers so they are self-dispensing, which is projected to save the health system about \$400,000. These automatic dispensers put out a measured dose of hand rub, and each self-contained unit has a leak guard and a clear product that does not congeal. Washing with soap and water is still available and required to kill toxins such as *C.difficile*.

Other hospitals also changed the location of their gel and soap dispensers. SJMHS had constructed a new patient tower with convenient hand-washing stations and alcohol-based hand rub dispensers inside each new single-patient room. But when surveyed, health care personnel indicated they considered the set-up insufficient. Personnel who moved between patient care units asked that dispensers be placed in the corridor between every two rooms. The hospital made the change, which satisfied health care personnel and offered an additional visual queue to perform hand hygiene. This intervention has been expanded to other units and divisions at SJMHS.

Virtua made sure to “have gel in the pathway” of health care practitioners and their work, said Sheila Simms, administrative director of medical/surgical critical care. WFUBMC implemented a more formal process if a dispenser was empty, recognizing that filling empty dispensers promptly was a problem. The



dispensers are now filled on a regularly scheduled basis. The hospital also placed additional dispensers in the pilot areas to help ensure that placement matched workflow.

### ***Hand hygiene compliance data are not collected or reported accurately or frequently***

One of the biggest problems with improving hand hygiene is lack of data, observed Sheretz, WFUBMC epidemiologist. Sheretz developed the content for training observers at WFUBMC so their observations were accurate and consistent. “When you have that data, you can focus on what you need to do to improve,” he said. “Sometimes the issue is administrative, sometimes it’s educational, and sometimes it’s a group that wasn’t aware.”

Most of the participating hospitals use staff members who volunteer to be hand hygiene observers. “We tried to use physical therapists, pharmacists, and environmental services cleaning staff,” said Miller of Exempla Lutheran. “These people are out and about, and staff members are used to them floating around [on the unit].” She looks forward to the promise of using technology for tracking compliance. “With secret shoppers, we’re only capturing a snapshot. The technology piece will be the gold standard,” she added. According to Christina Olsen, RN, nurse educator, Froedtert Hospital, “We identified staff members and specially trained them to collect valid and reliable observations. They did observations throughout shifts when they could fit in time.” Froedtert also used secret observers from disciplines outside the pilot unit, such as transport and dietary.

SJMHS used its own quality coaches for data collection. According to Robert MacDonell, system performance improvement leader, three to six staff members on each nursing unit, or at least one on each shift, are picked as quality coaches. The quality coaches help monitor quality and patient safety metrics—not just adherence with hand hygiene—in addition to caring for patients. They monitor and collect data and then send the data to the manager. “These people are known to their peers—they are known to be quality coaches,” said MacDonell. “What is not known is when they are collecting data or about whom.” He explained that when nurses are helping other staff with a patient, they also may be observing and watching things like hand hygiene. Rolland Mambourg, MD, vice president for medical affairs, added, “The quality coach is doing real-time observation collection...that is accurate.” Hoffman, the nursing unit manager, explained that the quality coaches, who also are bedside nurses doing direct patient care, have specific training materials and an observation sheet on their clipboards. Their involvement helps the hospital observe everyone, even in private rooms when the door is closed.

### ***Lack of accountability and just-in-time coaching***

Holding each other accountable is important. According to one unit manager, “There is a lot of peer pressure, with everyone reminding everyone.” She added, “Everybody has accountability...physicians, therapists, nurses. We learn from each other.”

At Cedars-Sinai Medical Center, the goal of 100 percent compliance in hand washing is part of every health care provider’s evaluation. Staff members are held accountable if they are non-compliant, not for punitive reasons but for patient safety, said Susan Rivera, RN, nurse manager. In most hospitals, coaching, mentoring or counseling is provided for non-compliant staff members. But after additional reminders, staff who continue being non-compliant may receive more formal reprimands from managers and senior administrators. At Cedars-Sinai, one of the participating hospitals using technology to help monitor compliance, staff on the test unit now can check their own compliance data electronically.

Hospital leadership plays an important role in modeling behavior for all staff. According to Richard Riggs, MD, medical director, Department of Physical Medicine and Rehabilitation at Cedars-Sinai, “We’re clear

with trainees that this is a core requirement. When they are caught not sanitizing their hands on rounds, we stop and make everyone do it. You must have leaders on the unit who walk the walk.” Jennifer Blaha, master black belt, performance improvement, concurs: “Folks in our department are champions. Everyone mimics, and everyone drives the culture. If a physician director does it, it trickles down.”

Just-in-time coaching is a key component to ensure accountability in Johns Hopkins Hospital’s neurosciences critical care unit (NCCU). Anonymous observers record hand hygiene performance—both compliance and non-compliance—and describe the person they are monitoring. Typically within 24 hours, just-in-time coaches go back and talk with the non-compliant staff member and ask: “What were the circumstances?” They discuss with the staff member what to do differently next time.

Several hospitals stress including accountability in a supportive environment. SJMHS uses unit-based dashboards to summarize and display performance and team feedback to “encourage, support and problem solve to move toward a goal,” said Mambourg. He added, “If someone is having difficulty, we talk to them to help. We have tried to create an encouraging and supportive, non-punitive atmosphere. Health care workers are highly motivated people. They will change if we help them.”

### ***Safety culture does not stress hand hygiene at all levels***

Exempla established an accountability policy based on the rule that it is unacceptable to not wash hands in the hospital. Leading up to Exempla Lutheran’s accountability policy was ensuring all systems worked. The hospital established a policy for how frequently dispensers are checked and for replacing and refilling them. “We did not do accountability until we got that right,” Miller added. Exempla Lutheran’s accountability policy for hand hygiene is modeled on its attendance policy. The policy is progressive: the first warning is verbal, then written, final written warning, and the last warning leads to termination. “Our administration was very supportive of the policy with the caveat that it needed to be equal for everyone, including physicians,” said Miller.

Physicians may be the most challenging group to comply, said Parks of Memorial Hermann The Woodlands. “We need a rule that encompasses everybody and holds everybody accountable,” he observed. “We can have all the secret observers and changes in nutrition and phlebotomy, but until we have a policy that has some teeth in it and act upon it, it is not going to happen.”

“Administration made the commitment and adopted a policy regarding accountability,” added Kingdon. Memorial Hermann’s policy was sent to the nurse practice council for input, and the council made the policy even stiffer than originally proposed. The policy stipulates the number of incidents of non-compliance with hand hygiene and what action will be taken. The actions escalate for every three incidents. Since hand hygiene compliance is so important, it is incorporated into the hospital’s Managing Performance and Behaviors at Work policy.

At SJMHS, the hand hygiene project “is happening in an environment that we have tried to create—improving safety and quality of service that we deliver,” said Mambourg. “The infrastructure is in place because we are engaged in a lot of patient safety and quality improvement activities.” Mambourg added that having quality coaches on every floor, having a qualified Six Sigma team and a vice president for quality all contributed to “trying to change to a culture attentive to quality and safety.” The culture helped teach people how to share and react to data “without taking opportunities for improvement personally but instead promoting a sense of engaging the entire care team,” he added. Hospital leaders and the system’s board also are apprised of performance metrics and supportive of these efforts.

Exempla Lutheran’s infection control office keeps weekly data and produces a patient safety report that discusses HAIs, hand hygiene compliance rate, medication errors, and other measures. The report is

distributed to all staff, managers, directors and board members. Each unit has unit-based councils, and they can post the report. "We want every single person in the organization to read the report every month," explained Miller.

At Johns Hopkins Hospital, performance scores also are posted by unit and available hospital-wide. Units can see where they rank in comparison to other hospital units. But "individual accountability is probably the most powerful thing that happened here," said Angela Feurer, assistant nurse manager, NCCU. When the unit identified a young resident who was a chronic offender, the chair of the department of neurosurgery took the issue seriously and after several reports, reprimanded the resident. "To get that kind of involvement and support was big," added Winner.

Simms at Virtua emphasized the importance of finding champions throughout the hospital to promote hand hygiene. "We are starting to hardwire processes. Leaders cannot watch staff 24/7. We are trying to get some champions that are infiltrated." They aim to get buy-in from all levels of the organization, so even the housekeepers can say, "Hey, doc, you didn't wash your hands." "We're trying to get everyone buying in," said Kate Gillespie.

### ***Ineffective or insufficient education***

On the NCCU at Johns Hopkins Hospital, the project team had the hands of health care personnel cultured so staff would understand the organisms that could linger on one's hands and to get buy-in. St. Joseph Mercy Health System used a CDC poster that showed how long bacteria can survive on surfaces that staff members touch every day. "That was a powerful message," said Russell Olmsted, director of infection prevention and control services. "The survival data was earth-shattering for staff. The environment can look clean but have significant concentrations of bacteria."

At Exempla Lutheran, non-compliant employees get an extra dose of hand hygiene education. They spend time with the infection control staff, have their hands cultured and must do a poster presentation on the topic back at their unit. Miller remembered one employee who had a bad attitude and was rude to IC staff. After spending just one half-hour with the IC staff, he completely changed his attitude and understanding. He had the misconception that gloves offered protection and later completed a great poster presentation in his unit. "He did not have bad intentions," emphasized Miller. "He had bad workflow processes and was disorganized in his care." The IC staff helped him better organize and improve his care routine.

Educating staff must be ongoing at hospitals to accommodate new staff, medical residents and others. Winner of Johns Hopkins, pointed out, "We are an academic medical center, and our staff turns over every July. We have the challenge of an influx of new staff. So the education is ongoing." According to Parks at Memorial Hermann, the hospital has done a much better job to drive the culture so hand hygiene becomes a habit. Hiring new employees and adding physicians means there is room for more education.

When finding solutions with other services that worked on unit floors, such as dietary, radiology and phlebotomy, the team at WFUBMC mapped out processes and worked on a solution with them. "We recognized that these were groups that were not in the business of infection control on a regular basis, so we helped them understand the logistics of the process and worked with them to come up with a solution," said Martin. He added, "Ancillary services may not be knowledgeable [about infection control], but they don't seem to resist ...they are open to change."

At SJMHS, a survey of attitudes and beliefs of personnel showed staff believed alcohol-based hand rub (ABHR) was drying and irritating their hands and skin. It was an issue in the dry and cold winter months

in Michigan. “It’s an urban legend and backwards thinking,” said MacDonell. But “it was one of our critical factors to address,” he added. The hospital’s infection prevention and control services (IPCS) helped educate staff that ABHR improves skin condition—because it contains moisturizers and emollients—and soap and water are more damaging. IPCS also sought staff feedback on different hand cleansing products and collaborated with the system’s product value analysis committee to implement changes in products as needed.

### ***Hands full***

Health care personnel may enter patient rooms with their hands full of medications or linens, making it difficult for them to wash their hands. At several hospitals, shelves were added inside or outside patient rooms or used more regularly to hold items while personnel washed their hands entering and exiting the room. Froedtert Hospital has decentralized nurse servers, so medications are available inside or outside patient rooms.

The NCCU at Johns Hopkins handles many new admissions each day, which creates a flurry of activity and a stream of people and supplies to the patient’s bedside. Feurer of the NCCU said they identified the core supplies needed and worked with the unit coordinator and support associates to put a bundle of supplies in place for admissions. They asked nurses to minimize the number of people at the patient’s bedside to two or three and had someone outside the room to help with other supplies, such as pain medication. A runner is assigned to hand over supplies as needed. The units also found that health care personnel entered a room and did not touch the patient but also did not perform hand hygiene, which was against the hospital’s policy. “We created a visual barrier,” said Feurer. “We did have yellow caution tape and educated staff that once you cross the threshold, hand hygiene needs to happen whether you touch the patient or not.”

### ***Wearing gloves interferes with process***

Another revelation for the team at Virtua was noticing that non-clinical staff members were going room to room with their gloves on. “They weren’t changing their gloves,” said Simms, who described this habit as “universal.” The team was “educating staff and working diligently to inform them that just because they have gloves on, they are not protecting themselves,” added Simms.

Physicians and nurses found it difficult to put on gloves when their hands were wet after sanitizing them. Beth Lanham from Froedtert suggested to “wash hands, gown and then put on gloves.” This helped solve that problem, although some staff needed to be reminded that wearing gloves did not negate the need to wash hands, she added.

### ***Perception that hand hygiene is not needed if wearing gloves***

Food and nutritional services staff at Memorial Hermann The Woodlands had been told it was OK to wear gloves when delivering food trays as long as they did not get visibly soiled. The staff would put on gloves and pass out 36 trays on one floor and then wash their hands after delivering all trays on the floor. They had the perception that gloves were safer, which is not necessarily true. Kingdon and her team worked with food and nutrition staff to “watch the process and determine a more efficient way to incorporate the hand hygiene process,” she said. Using Lean Six Sigma, the team minimized the number of times personnel had to clean their hands. The unit set-up features six rooms together in a pod. Personnel now park their carts in one place, clean hands, get a tray, deliver the tray and clean hands upon exit. Then they pick up the next tray, deliver it and clean their hands again on exit. By following this process, the exit cleaning also serves as the entry cleaning, as only the clean tray has been touched. These staff members no longer wear gloves. At some hospitals, dietary personnel have their own bottle of sanitizer on their carts.

### ***Health care workers forget***

Visual reminders—including posters on walls in units, on elevators and by dispensers, and stickers on dispensers—were used to some extent by all the hospitals. Signage needs to be switched now and then to keep the images and message fresh. “We had to change signage frequently,” said Susan Kulik, nurse manager, Nelson 8, Johns Hopkins Hospital. “People get used to looking at signage.” She added, “A huge factor is making staff more aware. Using visual reminders is one of the most effective methods of raising compliance.”

Johns Hopkins Hospital also used red lines at the thresholds to all patient rooms to serve as a reminder to “wash or don’t cross,” said Kulik. At Memorial Hermann The Woodlands, the door thresholds in the ICUs have red tape that goes up the side of the door with an arrow pointing to where the hand sanitizer is located. That area is marked “patient zone” to remind health care personnel and all visitors that they are crossing this threshold and should clean their hands. “We know hand hygiene has become a habit when a serious situation develops in the ICU and we see health care providers pause in the doorway to get hand sanitizer,” said Parks. “It is the last point at which a health care worker can get it right and prevent infection,” observed Rob Morehead, RN, infection control practitioner. “If we wash hands, we can still get it right,” he added.

A couple of hospitals involved patients and visitors in monitoring hand hygiene and reminding health care providers to wash their hands. According to nurse manager Rivera, “When Pam [unit manager] and I do our rounding, we ask the patient, ‘Did you notice your nurse sanitizing before coming in here?’ One hundred percent of patients say, ‘Yes, nurses and therapists are washing their hands all the time.’ ” Rivera added, “We would always encourage the patient to ask the provider [to wash hands]”. Blaha added that nurses and therapists can serve as role models. “Family members mimic staff,” she said. Cedars-Sinai also has placed kiosks across the hospital, so visitors know how important hand hygiene is, said Mark Noah, MD, medical director, graduate and continuing medical education at Cedars-Sinai.

At the Johns Hopkins NCCU, patients’ families were also invited to participate in the effort. “We provided hand hygiene score cards to families so they could score our compliance,” said Feurer. The patient representative in charge of the unit’s visitors’ lounge would give families the score card and basic information and ask if they would be willing to score. They targeted families who had been on the unit for more than 24 hours and did not have a family member in crisis. About half of the families did help, said Feurer. She stressed that the data collected from families was not used as part of their measurement data but primarily to make health care personnel aware that families are watching. If a family member mentions the name of a team member that was compliant, Feurer, the unit’s assistant nurse manager, highlights it on the staff bulletin board to recognize and thank that person.

### ***Distractions***

Visual cues and reminders also can help health care personnel who become distracted. Along with their name badge, employees at Memorial Hermann wear a badge with a hand that says “Clean In and Clean Out.” Individuals are taught to flash the badge to coworkers as a reminder. “We also try to give positive feedback to staff with leaders giving out cards that say, ‘You Got Caught Cleaning Your Hands,’” said Kingdon. “If someone did not wash their hands, the leaders provide this feedback as well and ask the individual why. This provides just-in-time coaching and potentially identifies an issue that needs to be resolved,” she added.

WFUBMC found its top root cause for failure to wash hands was distractions, which included staff having hands full, handling several requests at one time and being busy. “Distractions are a matter of changing your mind set,” said Martin, physician group member on the project.

Cavelli of Virtua added, "One of the hardest things is to have staff self-recognize their behavior. Every staff member says, "I do wash my hands. I do use soap." They are doing half of the process. "Self-regulation is half of the struggle," she said. Kim Ricker, the ICU nursing director, suggested that instead of telling staff they are not washing their hands, ask them why they did not. They may reply that they were doing something else, and it gives them an opportunity to reflect better than if someone points out their mistake or omission.

### **Targeted Solutions Tool (TST)**

The TST describes a six-step process:

**Step 1: Getting Started.** This first step includes determining who will be on the team and understanding stakeholders involved in the process. For example, in the ICU the hospital's dietary staff does not see patients, so their buy-in would be low. But on the medical/surgical unit, they deliver trays to every patient.

**Step 2: Training observers** entails training hand hygiene data collectors, or observers, and just-in-time coaches. It involves giving them the tool to begin collecting data and documenting contributing factors and compliance. The tool has a structured education program and a test at the end.

**Step 3: Measuring compliance** comprises collecting data and entering in data tool, a Web-based application that is part of the TST.

**Step 4: Determining factors** includes getting charts, which includes compliance charts, analysis charts and means chart.

**Step 5: Implementing solutions** by analyzing data from charts to identify the top three contributing factors for failure to wash hands. For each contributing factor, the TST provides a set of implementation guidelines.

**Step 6: Sustaining the gains** means rethinking the data collection plan to continue to monitor the process. Keeping compliance at a high rate requires "continuous reinforcement," emphasizes Melody Dickerson of the Joint Commission.

### **Controlling for Continual Improvement**

Continued process improvement includes identifying dips in compliance and working to constantly increase the compliance rate or keep it high. For example, Exempla Lutheran found that non-compliant people typically were new staff members or visiting health care personnel, such as nurses from agency groups. In response, the hospital added information on hand hygiene to employee orientation. Agency groups that provide nurses have incorporated hand hygiene in their training. Those nurses must view a CD-ROM with hospital policies and procedures before they become an agency worker. "When someone walks in our door, they have to sign a statement that says they have read and understand our hand hygiene policy," said Miller.

All the participating hospitals are working to sustain improvement as they roll out the hand hygiene project to other units. Froedtert Hospital's Lanham observed: "I still have the belief that hand hygiene compliance, or lack of, is not about individual people who don't care. All health care providers want to take the best possible care of patients. Lack of compliance is about processes that don't currently support the busy health care provider. We continue to identify obstacles and barriers. How do we make it easier for you?"

After the initial project with eight hospitals, the Center pulled in 27 additional pilot organizations to participate and look for new contributing factors. To date, no additional contributing factors have been identified beyond the current 15 factors. Pilot programs were conducted in a variety of hospitals, large and small, city and rural, teaching and nonteaching, located throughout the United States. The Center is preparing to pilot hand hygiene programs at skilled nursing facilities.

***About the Joint Commission Center for Transforming Healthcare***

The Joint Commission Center for Transforming Healthcare aims to solve health care's most critical safety and quality problems. The Center's participants—the nation's leading hospitals and health systems—use a proven, systematic approach to analyze specific breakdowns in patient care and discover their underlying causes to develop targeted solutions that solve these complex problems. In keeping with its objective to transform health care into a high-reliability industry, the Joint Commission will share these proven effective solutions with the more than 18,000 health care organizations it accredits. For more information, visit [www.centerfortransforminghealthcare.org](http://www.centerfortransforminghealthcare.org).

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Founded in 1944, the Health Research and Educational Trust (HRET) is the not-for-profit research and education affiliate of the American Hospital Association (AHA). HRET's mission is to transform health care through research and education. HRET's applied research seeks to create new knowledge, tools, and assistance in improving the delivery of health care by providers in the communities they serve. For more information, visit [www.hret.org](http://www.hret.org).

***About Hospitals in Pursuit of Excellence (HPOE)***

Hospitals in Pursuit of Excellence (HPOE) is the American Hospital Association's strategic platform to accelerate performance improvement and support health reform implementation in the nation's hospitals and health systems. HPOE provides education on best practices through multiple channels, develops evidence-based tools and guides, offers leadership development through fellowships and networks, and engages hospitals in national improvement projects. HPOE brings providers together to improve performance in several areas, including care coordination/readmissions, health care-associated infections, patient safety, and the development of new payment and care delivery models that promote quality and efficiency. Visit [www.hpoe.org](http://www.hpoe.org).