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Hand Hygiene in Dialysis: **The Simplest Solution**

By Keith Chartier, Editor in Chief

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The following report covers hand hygiene in the dialysis setting, an issue that is of extreme importance as the renal community fights to reduce infections and increase the quality of patients' care. There are numerous guidelines and tools available to help renal professionals adhere to proper hand hygiene, all of which can help improve dialysis care in the United States.

This report is sponsored by Alcavis HDC.

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The Simplest Solution

EXECUTIVE SUMMARY

It is often human nature to attack a complex problem with complex solutions. And as complicated as the spread of infection in dialysis clinics and hospitals can be, it's often the simplest of measures that can help stave off this threat: hand hygiene.

"It's critical that clinicians and patients understand the importance of hand hygiene," said Carolyn Latham, vice president of Clinical Quality, Fresenius Medical Care. "If procedures are carried out appropriately it can really help reduce the transmission of infections, but also stop outbreaks in healthcare facilities, including dialysis units."

Hemodialysis technologies have greatly improved the health and quality of life for hundreds of thousands of Americans with kidney disease and kidney failure. However, patients receiving these treatments are particularly vulnerable to healthcare-associated infections (HAIs) due to their weakened immune systems and the invasive nature of hemodialysis devices.

"We in dialysis deal with an immunocompromised cohort getting treated in a small space," said Shelly Malan, RN, CNN, clinical specialist, Alcavis HDC. "We deal with more body fluids than almost any other outpatient scenario, and we tend to be more attuned to visibly soiled hands and gloves because of the obvious blood, but give less thought to the thousands of pathogens that survive on our hands and under our nails."

The majority of dialysis patients are treated three times a week, further increasing the risk of being infected by pathogens present in healthcare settings. Recent reports are showing just how vulnerable this population is. For example, since 1994, rates of hospitalization for infection among hemodialysis patients have increased 45.8 percent, according to the 2010 Annual Data Report by the U.S. Renal Data System (USRDS). In addition, the U.S. Centers for Disease Control and Prevention (CDC) recently reported that about 37,000 infections occurred in 2008 in dialysis clinic patients.

"Cause-specific data show that the rate of hospitalization for vascular access infections appears to be declining," according to the 2010 USRDS report. "Since 2000, however, hospitalizations for bacteremia/sepsis have

This report will address:

- Dialysis-specific threats
- Barriers to proper hygiene
- Skin irritation
- Proper protocol
- Gloves and fingernails
- Program implementation
- The patient's role
- Performance indicators

been on the rise, a change which parallels the increasing use of cuffed catheters."

Seven in 10 patients who receive dialysis begin that treatment through a central line, according to the CDC. The central line is a tube usually placed in a large vein of a patient's neck or chest to deliver treatment in an intensive care unit, elsewhere in the hospital, and during dialysis.

"Certainly catheters play an important role in all of this, but pathogens can be transmitted by the hands to patients that don't have catheters," Latham said. "During the dialysis treatment, we use an extracorporeal circuit, and it's very important that we prevent any pathogens to going into the bloodstream of the patient."

A bloodstream infection can happen when germs enter the blood through a central line, often because proper procedures were not used while the central line was placed or maintained.

"People in the renal community have recognized for some time now that infections are a problem," said Priti Patel, MD, medical officer, Division of Healthcare Quality Promotion, CDC. "There has been a lot of attention paid to in-patient settings to prevent infections. There is a lot of room for improvement in dialysis, and there are a lot of opportunities. This is a great time for the renal community to catalyze around the various issues that they can take the lead on in preventing infections."

Dialysis-Specific Threats

"There are several types of bacteria that reside on your hand. Some are picked from the environment, and others are resident to your hand," said Catherine Firanek, BSN, MBA, director, Medical Affairs, Baxter Healthcare. "They live there; they stay there all the time. For example, one would have some of the gram-positive bacteria, such as staph aureus, naturally living on the hand. Other people might have fungus under the fingernails. You can actually have anything on your hands because whatever you touch will be picked up."

Bloodborne pathogens are a problem in dialysis, according to Patel. Hepatitis C virus infection is one area of concern as is Hepatitis B infection. "We don't see as much transmis-

Online Resources

CDC Hand Hygiene Home Page: http://www.cdc.gov/handhygiene/

Guideline for Hand Hygiene in Health-Care Setting:
www.cdc.gov/mmwr/PDF/rr/rr5116.pdf

WHO Guidelines on Hand Hygiene in Health Care: http://whqlibdoc.who.int/publications/2009/9789241597906_eng.pdf

ESRD Conditions for Coverage: www.cms.gov/CFCsAndCoPs/downloads/ESRDfinalrule0415.pdf

CfC Interpretive Guidelines:
esrdnetwork6.org/utils/pdf/Interpretive%20Guidance%202008.pdf

iScrub iPhone App:
http://itunes.apple.com/us/app/iscrub-lite/id329764570?mt=8

New England Journal of Medicine Hand Hygiene Video:
www.nejm.org/doi/full/10.1056/NEJMvcm0903599?emp=marcom

sion reported nowadays, but a lot of that is because of isolation practices and also vaccinations of patients," Patel said.

In addition, dialysis patients are at risk for infections and becoming colonized with various antimicrobial resistant organisms, such as S. aureus. "We know, for example, that invasive methicillin-resistant Staphylococcus aureus (MRSA) infections disproportionately affect dialysis patients compared to the general population at rates a hundred times the general population," Patel added. "Certainly, the burden of those types of organisms is greater in dialysis patients. It's hard to know whether transmission of those organisms is occurring is outpatient dialysis facilities or if patients are acquiring these infections, for example, in the hospital. It's hard to sort that out. That's another area of concern and someplace that we need additional work done."

Many dialysis clinics and healthcare facilities today follow the CDC's "Guideline for Hand Hygiene in Health-Care Settings," which was released in late 2002, by John M. Boyce, MD, of the Hospital of Saint Raphael in New Haven, Conn., and Didier Pittet, MD, of the University of Geneva in Switzerland. In order to help healthcare professionals better understand hand hygiene procedures, the authors first give a basic explanation of what some of these pathogens are and how they are transmitted.

Normal human skin is colonized with bacteria, which can be divided into two categories: transient and resident. Transient flora, which colonizes the superficial layers of the skin, is easier to remove with routine handwashing. These types of bacteria are often transferred to the healthcare worker (HCW) through direct contact with patients or contact with contaminated environmental surfaces within close proximity of the patient. Transient flora are the organisms most frequently associated with healthcare–associated infections, according to the CDC.

On the other hand, resident flora are attached to deeper layers of the skin and are harder to remove. In addition, resident flora (e.g., coagulase-negative staphylococci and diphtheroids) are less likely to be associated with such infections , according to the CDC. The hands of HCWs may become persistently colonized with pathogenic flora (e.g., S. aureus), gram-negative bacilli, or yeast.

Patel said much of the CDC's focus right now is on vascular access infection, including bloodstream infections. "That's driven by the fact that we know there is a substantial burden of those infections and they cause a great deal of morbidity and mortality in dialysis patients," she added.

In fact, the CDC recently updated its guidelines for catheter-related bloodstream infections in April. They can be found on the CDC website, and they were published in the April 1 issue of *Clinical Infectious Disease*.

According to the CDC, the transmission of healthcare-associated pathogens from one patient to another through the HCW hands occurs in the following sequence of events: 1) the organisms present on the patient's skin are transferred to the HCW's hands, 2) these organisms survive for at least several minutes on the hands, 3) either the HCW's handwashing is poor or nonexistent or the product used is inappropriate, and 4) the contaminated hands come in di-

rect contact with the patient, or an object that will come into direct contact with the patient.

"The flora that lives on your hands will not cause an infection to you, but if you introduce it into a sterile cavity like in peritoneal dialysis it can cause an infection," said Firanek, who spoke about hand hygiene at the American Nephrology Nurses Association (ANNA) annual meeting in Boston on March 28. She also has a paper on peritoneal dialysis and hand hygiene set to be published this summer in *Peritoneal Dialysis International*. "I am a peritoneal dialysis person. One of the things we are most concerned about with home dialysis patients, and specifically peritoneal dialysis, is peritonitis," Firanek added.

Peritonitis is the infection of the cavity where the tube sits and at the catheter exit site. The area where the tube comes out of the abdomen can house bacteria. "Some are easily treated, and some are not," Firanek said. "With any peritonitis comes pain, and of course, resource allocation. The patient has to come into the clinic, they have to get antibiotics, so there's cost there. Some may end up in the hospital, and they could end up losing that catheter. That could also leave behind damage to the peritoneal cavity, which they are dependent on for peritoneal dialysis."

One of the main recommendations the CDC made in its guidelines to combat infections is the use of alcohol-based sanitizers, which seems to be widely adopted among dialysis clinics. "At Fresenius Medical Care, we are currently following the CDC recommendations that came out in 2001 for infection prevention, and also the 2002 hand hygiene guidelines, which recommend alcohol-based hand rubs," said Kerri Holloway, Clinical Quality Manager, Fresenius Medical Care. "We keep alcohol-based hand rubs at all of our patient machines so that they are right there where a healthcare provider can access it immediately. We also have soap and water, and we instruct them about when it is appropriate to use soap and water, how often they should use it. Patients and families are encouraged to use the same soap and water/hand hygiene that all of our procedures are based on."

Latham contended that alcohol-based hand rubs have been one of the best products that became available to healthcare facilities. "That has really helped with making sure that staff are adhering to hand hygiene," she said. "Early on, people thought they were going to have more irritation because of the hand rubs. They have actually found they are less irritating than basic handwashing."

Barriers to Proper Hygiene

It's easy to see that step 3 is the one part of the above-mentioned infection transmission sequence that can be controlled, which begs the question: Why would adherence be anything less than 100 percent?

Malan said that some of the barriers in dialysis are similar to other healthcare entities, such as economic barriers, inaccessibility issues, hand irritation, inadequate time to clean, interference with the flow of patient care, lack of knowledge to guidelines, and a failure to recognize it as part of performance of one's duties. The renal-specific barriers, she added, include suboptimal enforcement, less policing from infection-control practitioners and

Factors that Influence Hand-Hygiene Practices

Observed risk factors for poor adherence to recommended hand-hygiene practices

- Nursing assistant status (rather than a nurse)
- Physician status (rather than a nurse)
- Male sex
- Working in an intensive-care unit
- Working during the week (versus the weekend)
- Wearing gowns/gloves
- Automated sink
- Activities with high risk of cross-transmission
- High number of opportunities for hand hygiene per hour of patient care

Self-reported factors for poor adherence with hand hygiene

- Handwashing agents cause irritation and dryness
- Sinks are inconveniently located/shortage of sinks
- Lack of soap and paper towels
- Often too busy/insufficient time
- Understaffing/overcrowding
- Patient needs take priority
- Hand hygiene interferes with healthcare worker relationships with patients
- Low risk of acquiring infection from patients
- Wearing of gloves/beliefs that glove use obviates the need for hand hygiene
- Lack of knowledge of guidelines/protocols
- Not thinking about it/forgetfulness
- No role model from colleagues or superiors
- Skepticism regarding the value of hand hygiene
- Disagreement with the recommendations
- Lack of scientific information of definitive impact of improved hand hygiene on healthcare–associated infection rates

Additional perceived barriers to appropriate hand hygiene

- Lack of active participation in hand-hygiene promotion at individual or institutional level
- Lack of role model for hand hygiene
- Lack of institutional priority for hand hygiene
- Lack of administrative sanction of noncompliers/rewarding compliers
- Lack of institutional safety climate

* Source: From the CDC Hand Hygiene guidelines, and adapted from Pittet D. Improving compliance with hand hygiene in hospitals. Infect Control Hosp Epidemiol 2000;21:381–6.

quality-assurance staff, a relatively high frequency rate of re-gloving, and washing and gel use compared to acute or other outpatient facilities.

"Some of the challenges to dialysis include the fact that a lot of healthcare providers are constantly under pressure to be more efficient, to get patients in and out very quickly," Patel said. "There are a lot of financial pressures. Those are things that are barriers. One study found that adherence was related to ratios. The more nursing staff you had the better your hand hygiene was and the more time you had in between shifts to better your hygiene with. That's not surprising to us, that the pressure that leads to understaffing or procedures would undermine hand hygiene adherence."

One of the most common barriers that Latham said she used to see was not having time to wash their hands. "The introduction of the hand sanitizers has really helped improve hand hygiene in the dialysis facility—actually in all healthcare facilities—because staff have more access to the sanitizers, they are at the point of care. That has really helped to reduce that particular barrier."

Studies have shown that the frequency of handwashing or antiseptic handwashing by personnel is affected by the accessibility of hand-hygiene facilities, according to the CDC guidelines. In certain healthcare facilities, only one sink is available in rooms housing several patients, or sinks are located far away from the door of the room, which may discourage handwashing by people who are leaving the room.

Pocket carriage of alcohol-based hand-rub solutions, combined with availability of bedside dispensers, has been shown to improve hand-hygiene protocols, the CDC said. The CDC touts the use of dispensers for alcohol-based hand rubs as a way to make things easier. They do not require plumbing and can be made available adjacent to each patient's bed and at many other locations in patient-care areas, the CDC noted.

"To avoid any confusion between soap and alcohol hand rubs, alcohol hand-rub dispensers should not be placed adjacent to sinks," according to the CDC. "HCWs should be informed that washing hands with soap and water after each use of an alcohol hand rub is not necessary and is not recommended, because it may lead to dermatitis. However, because personnel feel a 'build-up' of emollients on their hands after repeated use of alcohol hand gels, washing hands with soap and water after 5–10 applications of a gel has been recommended by certain manufacturers."

Skin Irritation

Another barrier to hand hygiene adherence could be skin irritation associated with using certain products. People may complain of a feeling of dryness or burning; skin that feels rough; and erythema, scaling, or fissures.

"Because HCWs may wash their hands from a limited number of times per shift to as many as 30 times per shift, the tendency of products to cause skin irritation and dryness is a substantial factor that influences acceptance, and ultimate usage," according to the CDC guidelines. "For example, concern regarding the drying effects of alcohol was a primary cause of poor acceptance

of alcohol-based hand-hygiene products in hospitals in the United States. However, several studies have demonstrated that alcohol-based hand rubs containing emollients are acceptable to HCWs. With alcohol-based products, the time required for drying may also affect user acceptance."

In order to reduce how much an irritating agent must be used, the CDC recommends first using the product less and replacing it with products that cause less damage to the skin, educating staff on the risks of contact dermatitis, and the use of moisturizing skin-care products or barrier creams.

However, when evaluating hand-hygiene products for potential use in healthcare facilities, administrators or product-selection committees must consider factors that can affect the overall efficacy of such products, including the relative efficacy of antiseptic agents against various pathogens and acceptance of hand-hygiene products by personnel, the CDC recommended.

"Soap products that are not well-accepted by HCWs can be a deterrent to frequent handwashing," according to the CDC. "Characteristics of a product (either soap or alcohol-based hand rub) that can affect acceptance by personnel include its smell, consistency (i.e., 'feel'), and color. For soaps, ease of lathering also may affect user preference."

Proper Protocol

The latest End-Stage Renal Disease Conditions for Coverage (CfC), which were released in 2008, may be the best place to look for the proper hand hygiene protocol in part because it's what Medicare surveyors will be looking for when they are inspecting dialysis clinics. And it's these inspections that keep clinics certified and eligible to receive Medicare reimbursement.

"Hand hygiene" includes either washing hands with soap and water, or using a waterless alcohol-based antiseptic hand rub with 60 percent to 90 percent alcohol content, according to the CfC Interpretive Guidelines released by the Centers for Medicare & Medicaid Services (CMS). "Hands should be washed with soap and water if visibly soiled. If not visibly soiled, hand hygiene with alcohol-based hand rub may be used. The CDC recommends that handwashing incorporate rubbing hands together 'vigorously' for 15 seconds, and that the use of alcohol-based rubs incorporate covering all surfaces of hands and fingers, until hands are dry."

Here are some examples of when hand hygiene should be performed:

- After touching blood, body fluids, secretions, excretions, and potentially contaminated items;
- Before and after direct contact with patients;
- Before performing any invasive procedure such as vascular access cannulation or administration of parenteral medications;
- Immediately after gloves are removed;
- After contact with inanimate objects, including medical equipment or environmental surfaces at the patient station;
- Before entering and on exiting the patient treatment areas; and
- When moving from a contaminated body site to a clean body site of the same patient.

The Conditions also require that a sufficient number of sinks with warm water and soap should be available to facilitate hand washing. A "sufficient number" means that sinks are easily accessible and readily available in the patient treatment area and in other appropriate areas such as the reuse room, medication area, home training room, and isolation area/room to meet the needs of the staff and patients, according to the guidelines. Sinks must be plumbed with both hot and cold water; if the flow of water is started through motion detection, adjustments to the system must assure that warm water is available to encourage staff to wash their hands, according to CDC recommendations.

Handwashing sinks should be dedicated only for handwashing purposes and should remain clean, according to the CfCs. "Avoid placing, cleaning, or draining used items in handwashing sinks," the guidelines state. "Used or contaminated items should be handled in designated utility sinks. The facility should have a sink available for patients to wash their access sites prior to treatment and their hands after treatment. This sink may also be used by staff for handwashing. Soap and a supply of paper towels protected from contamination must be available at each sink."

The CfCs require hand hygiene after every direct contact with a patient and between patient contacts, even if the contact is casual. However, gloves are not necessary for casual social contact with a patient. For example, staff members may touch the patient's shoulder, take his/her arm, or shake hands without wearing gloves, according to the Interpretive Guidelines. However, gloves should always be worn anytime contact with blood or body fluids is anticipated.

According to the CDC, even with glove use, hand hygiene is necessary after glove removal because hands can become contaminated through small defects in gloves and from the outer surface of gloves during glove removal.

Home dialysis patients also need to closely follow hand hygiene guidelines. "Most peritoneal dialysis patients are told to use a clean towel and preferred to use a paper towel. Paper towels can come in a lot of strengths. You should pat your hands dry instead of rubbing them. You don't want to use other folks' towels. The paper towels should be better quality so they don't rough up your hands," Baxter's Firanek said.

Gloves and Fingernails

In addition to following proper handwashing techniques, the Conditions for Coverage also require dialysis staff to wear disposable gloves when caring for the patient or touching the patient's equipment at the dialysis station. In addition, staff must remove gloves and wash hands between each patient or station.

"Because exposure to blood and potentially contaminated items can be routinely anticipated during hemodialysis, gloves are required whenever caring for a patient or touching the patient's equipment," according to the CfC Interpretive Guidelines. "To facilitate glove use, a supply of clean nonsterile gloves and waste receptacles should be readily accessible to each dialysis station and work area. Gloves should be changed frequently during patient care."

Examples of when gloves should be worn:

- Staff members should wear gloves while performing procedures which have the potential for exposure to blood, dialysate and other potentially infectious substances.
- Gloves must be provided to patients and visitors if these individuals assist with procedures which risk exposure to blood or body fluids, such as when self-cannulating or holding access sites post treatment to achieve hemostasis.
- Chair-side computer keyboards/screens can easily become contaminated because of their proximity to the patient station. Hand hygiene is imperative after contact with the chair-side computer and before contact with the patient, regardless of whether contact with the computer occurred through gloved or ungloved hands.

Examples of when gloves should be changed:

- When soiled (e.g., with blood, dialysate or other body fluids);
- When going from a "dirty" area or task to a "clean" area or task. The CDC defines a "dirty" area as an area where there is a potential for contamination with blood or body fluids and areas where contaminated or "used" supplies, equipment, blood supplies or biohazard containers are stored or handled. A "clean" area is an area designated only for clean and unused equipment and supplies and medications;
- When moving from a contaminated body site to a clean body site of the same patient; and
- After touching one patient or their machine and before arriving to care for another patient or touch another patient's machine.

In addition, the CfCs require a new pair of clean gloves must be used each time for access site care, vascular access cannulation, administration of parenteral medications or to perform invasive procedures. "The intention is to ensure that clean gloves which have not previously touched potentially contaminated surfaces are in use whenever there is a risk for cross contamination to a patient's blood stream to occur," according to CMS.

Fingernails could also be a potential source of infection transmission. For example, Fresenius Medical Care prohibits the use of artificial fingernails, and wants the natural fingernail length to be kept to a quarter of an inch or less, according to Latham.

Studies have documented that subungual areas of the hand—the areas beneath the fingernail—harbor high concentrations of bacteria, most frequently coagulase-negative staphylococci, gram-negative rods, Corynebacteria, and yeasts, according to the CDC. Freshly applied nail polish does not increase the number of bacteria recovered from periungual skin, but chipped nail polish may support the growth of larger numbers of organisms on fingernails, the CDC warned it its guidelines. Even after careful handwashing or the use of surgical scrubs, personnel often harbor substantial numbers of potential pathogens in the subungual spaces.

Program Implementation

Given the barriers to 100 percent adherence to proper hand hygiene, it's important to understand how to build an effective program to push proper hand hygiene. However, changing a system versus an individual is easier said than done.

In its guidelines, the CDC lists the following factors necessary for change: 1) dissatisfaction with the current situation, 2) perception of alternatives, and 3) recognition, both at the individual and institutional level, of the ability and potential to change.

"The settings where everybody is involved and excited about this is wonderful to see," Patel said. "It really is a shared responsibility of everyone in the unit. Infection prevention is not something that is limited to one person. Anyone who comes into that unit has some responsibility with respect to infection prevention. Anybody can be a champion."

The CDC's Hand Hygiene in Healthcare website (www.cdc.gov/handhygiene) is an excellent resource for hand hygiene program implementation. It includes training help, promotional campaign material, patient materials, and ways to measure how your clinic is doing with hand hygiene, among others.

In the March 2011 issue of *Critical Public Health*, researchers Sarah Wilson of the University of Guelph in Ontario, Canada, and Casey Jacob and Douglas Powell of Kansas State University, suggested that messages aimed at improving hand hygiene compliance should provoke a significant level of human emotion such as disgust or discomfort in order to be effective.

The researchers acknowledged the low levels of compliance with handwashing in hospitals and other settings such as food service and that despite ongoing training and education efforts, individuals are not compelled to observe proper hand sanitation practices. Wilson and colleagues conducted a literature review to identify alternative interventions for triggering change in hand hygiene behavior. The researchers said that of those interventions, those that employ social pressures have demonstrated varying influence on an individual's behavior, while interventions that focus on organizational culture have demonstrated positive results. They added, however, that recent research indicates that handwashing is a ritualized behavior mainly performed for self-protection; therefore, interventions that provoke emotive sensations or use social marketing may be the most effective.

In addition to provoking emotion, positive reinforcement can also help improve hand hygiene compliance, according to a study in the January 2011 issue of *Infection Control and Hospital Epidemiology*. In that study, Jeanmarie Mayer, MD, from the University of Utah School of Medicine, and colleagues, said an interventional cohort study that used a behavioral change approach was one of the earliest and largest institution-wide programs promoting alcohol sanitizer from the United States that has shown significant and sustained improvements in hand hygiene compliance.

In their quasi-experimental study from August 2000 to November 2001 and a descriptive time series from April 2003 to December 2006 in a 450-bed teaching hospital, Mayer and colleagues reported that they introduced an initial intervention bundle in pilot locations that addressed cognitive behavioral factors, which included access to alcohol sanitizer, education, and ongoing audit and feedback. This bundle was disseminated hospital-wide, along with a

novel approach focused on behavior modification through positive reinforcement and annually changing incentives.

The researchers report that 36,123 hand hygiene opportunities involving all categories of healthcare workers from 12 inpatient units were observed from October 2000 to October 2006. They also report that the rate of compliance with hand hygiene significantly improved after the intervention in two cohorts over the first year (from 40 percent to 64 percent of opportunities and from 34 percent to 49 percent of opportunities. Mean compliance rates ranged from 19 percent to 41percent of 4,174 opportunities (at baseline), increased to the highest levels of 73 percent to 84 percent of 6,420 opportunities two years after hospital-wide dissemination, and remained improved at 59 percent to 81percent of 4,990 opportunities during year six of the program.

The researchers concluded that their creative campaign, which used ongoing frequent audit and feedback with novel use of immediate positive reinforcement, was implemented at an acceptable cost to the institution.

In its guidelines, the CDC suggested that healthcare workers need to be told the rationale behind hand hygiene. They need to be educated on the potential risks of transmission. In addition, staff needs to be told the morbidity, mortality, and costs associated with healthcare–associated infections.

In addition, the CDC said facilities need to spell out specific hand-hygiene steps for staff, i.e., the amount of hand-hygiene solution needed, the duration of a hand-hygiene procedure, and the selection of hand-hygiene agents.

"Alcohol-based hand rubs are the most efficacious agents for reducing the number of bacteria on the hands of personnel," the CDC wrote. "Antiseptic soaps and detergents are the next most effective and non-antimicrobial soaps are the least effective. Soap and water are recommended for visibly soil hands. Alcohol-based hand rubs are recommended for routine decontamination of hands for all clinical indications (except when hands are visibly soiled) and as one of the options for surgical hand hygiene."

Among the choices of active ingredients to choose—triclosan, CGH, silver, benz chloride—alcohol has been a proven active that is both inexpensive and effective, said Alcavis HDC's Malan. "Alcohol is fast acting, leaves no residue, is compatible with other disinfectants, is effective against vegetative bacteria, fungi and to some extent viruses, evaporates quickly (not always a benefit for surfaces but a positive for skin), and can be colored and scented," she added. "Gel formulations enhance the effects due to a slightly slower absorption time. Not all alcohols possess the same bacterial efficacy (Propanol—Iso Propanol—Ethanol) but you can adjust percents in each to improve kill. Alcohol-based sanitizers with a higher ethanol content along with moisturizing agents and protective agents are superior (better efficacy and less irritation)."

Implementing a good program also means identifying methods for staff to maintain the health of their own skin. There should be information available about lotions and how creams can prevent or minimize skin dryness and irritation caused by irritant contact dermatitis.

Expectations of patient care managers/administrators should also be transparent. Writ-

ten statements regarding the value of, and support for, adherence to recommended hand-hygiene practices should be made. In addition, the CDC recommended using role models to demonstrate adherence to recommended hand hygiene practices.

"It takes several methods to teach the staff and remind them of the importance of hand hygiene," Fresenius' Latham said. "We utilize posters, but we also utilize traditional training programs. We also have instituted observational surveys that are done to make sure that the staff is adhering to the policies and procedures. It helps remind staff the appropriate techniques."

The Patient's Role

Motivation is a key tenet in adopting any change. "People are either motivated to take care of themselves or they're not," Firanek said. "If somebody is motivated, you can consistently encourage them to follow directions and do what you ask them to do."

This is true of healthcare staff and patients. In fact, Firanek suggested that there is a direct link between patient hand hygiene and what they observe healthcare workers doing on a daily basis. "We have certain rules that we ask patients to abide by, and then they'll go into a hospital setting or another doctor's office and see something different," she added. "We need to maintain that role model, so to speak, so that people continue to do properly wash their hands."

Facilities should also talk about hand hygiene every month that home patients come in, constantly reminding them and quizzing them on the things that could happen if they don't do things properly, said Firanek.

"Hand hygiene is part of good vascular access care, and there is a movement to more self care—whether it be self-cannulation or home dialysis," Patel said. "To the extent that patients are participating in their own care; it's essential. Also, part of the shared healthcare environment that occurs within in-center dialysis settings, it's important that patients perform hand hygiene so that they're not contaminating various surfaces in dialysis settings that could come into contact with other patients."

In conjunction with the World Health Organization's (WHO) 2009 Guidelines for Hand Hygiene, members of the Clean Care is Safe Care task force undertook a review of the evidence for implementing a successful patient empowerment/healthcare worker (HCW) empowerment program for hand hygiene compliance improvement in the January/February 2011 issue of the *American Journal of Medical Quality*.

Based on 11 years of research and more than 133 papers and abstracts, evidence suggested that successful empowerment programs, which also may be referred to as patient participation or patient involvement programs, contribute to an overall successful hand hygiene compliance program, and can be considered a "win-win strategy," according to the study.

In addition, the research found, successful patient and HCW empowerment programs are usually part of a multimodal approach to education and monitoring, and include at least one of the following elements: educational tools, motivation tools, and role modeling.

They also include having the HCW give explicit permission to the patient to remind the HCW about hand hygiene.

The WHO team reminded infection prevention colleagues that empowerment does not always translate across cultures easily. Certain cultural norms about healthcare and authority, as well as norms on perceived gender roles, religion, and age, all impact a patient's willingness to remind their HCW to perform hand hygiene. The same factors impact a HCW's willingness to embrace the patient participation concept.

"Culture and religion may prevent some people from using alcohol-based hand rubs," Fresenius' Holloway said. "You have to be aware of those types of issues when educating staff. You have to understand that that's part of their self. We have to acknowledge that and teach them good hand hygiene with soap and water."

Recent examples of patient empowerment research include the work conducted by Dr. Maryanne McGuckin and colleagues to promote empowerment programs as part of the hand hygiene compliance education during the last decade, which have reported increase in compliance when empowerment is implemented. In the May/June 2009 issue of *The American Journal of American Quality*, they reported on hundreds of hospitals from the United States that monitored monthly hand hygiene rates based on common methodology for data collection and education. Patient empowerment, including HCWs instructing patients to offer reminders (or thanking their HCWs) for performing hand hygiene, has been proven to improve compliance by more than 40 percent over original scores in ICUs and non-ICUs.

Although healthcare workers say that patient participation in hand hygiene protocols would be helpful, about one-third of these healthcare professionals admit that they would not like to be reminded by patients to wash their hands, researcher Yves Longtin, MD, of Geneva University Hospital, reported in a presentation of his data at the 50th Interscience Conference on Antimicrobial Agents and Chemotherapy held in Boston in September 2010.

This is just one of several findings from a survey Longtin conducted to assess hand hygiene practices among 750 randomly selected physicians and nurses working at a teaching hospital. Respondents completed a 10-minute survey that questioned them about their knowledge and perception of hand hygiene and patient participation programs; Longtin reported that 60 percent of respondents said they believed that medical errors could be prevented by patient collaboration, and that 58 percent said that patient participation could improve hand hygiene practices and compliance.

Longtin also reported that 30 percent of respondents said they would not appreciate being reminded of hand hygiene by a patient, and 43 percent said they would feel humiliated to admit to forgetting to perform hand hygiene to a patient. Longtin also says that 16 percent of respondents said patients would have to take some responsibility for a poor outcome if they participated in a facility's hand hygiene program.

Performance Indicators

Finally, with proper protocol in place, it's still vital for dialysis clinics to track performance in order to evaluate how well staff and patients are adhering to hand hygiene.

The CDC recommends the following performance indicators for measuring improvements in HCWs' hand-hygiene adherence:

- Periodically monitor and record adherence as the number of hand-hygiene episodes performed by personnel/number of hand-hygiene opportunities, by ward or by service.
- Provide feedback to personnel regarding their performance.
- Monitor the volume of alcohol-based hand rub (or detergent used for hand-washing or hand antisepsis) used per 1,000 patient-days.
- Monitor adherence to policies dealing with wearing of artificial nails.
- When outbreaks of infection occur, assess the adequacy of health-care worker hand hygiene.

The last pages of this *RBT* report includes a copy of the "Hand Hygiene and Glove Use Audit Tool" that was developed by the CDC/Delmarva Foundation Dialysis Collaborative to help increase observations in healthcare clinics. "We came up with a tool that we basically modified," Patel said. "We took a tool that's used in hospitals and modified it for the hemodialysis setting. However, we encourage facilities to use whatever tool they feel comfortable with, whether they have a tool that they've been using for some time. The important thing is to actually do observations of hand hygiene and other infection prevention practices, to monitor those practices and to give staff feedback on how they are doing."

The CDC's Patel said these observation duties shouldn't be placed on someone who is in the midst of clinical care responsibilities. "Sometimes it might be a supervisor, a nurse manager, or sometimes someone who is a mole who can't be identified by others. That could be a nutritionist, a social worker, or any number of other people," Patel added. "A lot of these observations don't take very much time."

Another interesting tool that could be used to aid observation is the free iPhone application the University of Iowa developed called iScrub Lite. "iScrub Lite is an application for healthcare professionals who wish to monitor hand-hygiene compliance without the time-consuming and error-prone use of clipboards and transcription," the app's developers wrote on the Apple iTunes page. "Use iScrub Lite to record observations annotated with time, location and job role."

The application is customizable, and users can edit the default lists of locations, job types, and observation notes in order to suit particular facility's needs. "We have some members in our collaborative that are using the iScrub app, which is an iPhone hand hygiene application that allows them to do hand hygiene audits on their phone," Patel said. "You can make modifications, so you can change the types of providers that you're observing and you can download that data."

The CDC's goal is to make various tools available to people to make it easier for them to observe protocol and improve practices, Patel said, and different facilities go about doing things in different ways. The common thread in any tool or varying approach is adherence to proper hand hygiene.

"[Hand hygiene] is the cornerstone for infection control and considered one of the most important measures in preventing the spread of infection," said Holloway. "It protects the patients and the staff against healthcare-environment pathogens and the harmful pathogens that are carried by patients and staff. It's probably the simplest and most effective measure." **RBT**

HEMODIALYSIS HAND HYGIENE AUDIT TOOL
OBSERVATIONS OF ADHERENCE

Minimum of 30 observations per month

Facility name _____ Date _____ Start time _____ AM / PM (circle)

Dialysis Schedule: MWF TTS Shift: 1st 2nd 3rd 4th

Section of unit: _____ Number of patients in section: _____

Observer name _____ Location of observer within unit _____

Duration of observation period: _____ minutes

Hand Hygiene Observations

(Use a "√" for each 'hand hygiene opportunity' observed. Under 'opportunity successful', use a "√" if successful, and leave blank if not successful)

	Hand Hygiene		
Discipline	Hand hygiene opportunity	Opportunity successful	Describe any missed attempts (e.g., during medication prep, between patients, after gross contamination with blood, etc)

Discipline: **P**=physician, **N**=nurse, **T**=technician, **S**=student, **D**=dietician, **W**=social worker, **O**=other

Total number of patients observed during audit: _____

X. Total hand hygiene opportunities observed: _____

Y. Total successful hand hygiene opportunities: _____

Hand hygiene adherence = Y / X

Please report Y & X monthly

GUIDE TO HAND HYGIENE OPPORTUNITIES IN HEMODIALYSIS

Hand Hygiene Opportunity category (1 through 5)	Specific Examples
1. Prior to aseptic procedures	• Prior to cannulation or accessing catheter • Prior to performing catheter site care • Prior to parenteral medication preparation • Prior to administering IV medications or infusions
2. Prior to touching a patient	• When moving from machine to patient • Prior to entering station to provide care to patient • Prior to contact with vascular access site • Prior to adjusting or removing cannulation needles
3. After body fluid exposure risk	• After exposure to any blood or body fluids • After contact with other contaminated fluids (e.g., spent dialysate) • After handling used dialyzers, blood tubing, or prime buckets • After performing wound care or dressing changes
4. After touching a patient	• When leaving station after performing patient care • After removing gloves
5. After touching patient surroundings	• After touching dialysis machine • After touching other items within dialysis station • After using chairside computers for charting • When leaving station • After removing gloves

Please make note of the following during this session.

	Yes	No	Not applicable	Comments
There is a sufficient supply of alcohol-based hand sanitizer				
There is a sufficient supply of soap at handwashing stations				
There is a sufficient supply of paper towels at handwashing stations				
There is visible and easy access to hand washing sinks/soap or hand sanitizer				

ADDITIONAL COMMENTS / OBSERVATIONS: