

HAND HYGIENE

Good hygiene, smart economics go hand in hand

by Susan Cantrell, ELS

If you had easy access to something that had unquestionably been proven to better the lives of your patients, as well as yourself, would you keep it close and use it religiously, or would you cavalierly pass it on by? Common sense tells us we would never want to be without such a thing; yet, on a daily basis, potential life savers get passed by.

Hand hygiene. We have known since the early 1800s that keeping our hands clean, particularly in the healthcare setting, can save lives. Almost 200 years later, the Centers for Disease Control and Prevention still has to remind us how important it is to wash our hands.

Hand hygiene is of paramount importance for healthcare workers (HCWs), who move from patient to patient, but the patient also should be included in any handwashing campaign, pointed out J. Hudson Garrett, Jr, PhD, MSN, MPH, Vice President, Clinical Affairs, PDI Inc., Orangeburg, NY. "In healthcare, we all too often forget the patient as the center of care, and this certainly includes involving them in the hand-hygiene program. The patient can serve as a reminder to caregivers to sanitize their hands, when indicated, but [they] also can be actively engaged in practicing hand hygiene themselves."

Keeping hands squeaky clean

"Offering patients hand hygiene can be beneficial in the prevention of healthcare-associated infections (HAIs) and in improving patient-satisfaction scores," continued Garrett. "PDI's Sani-Hands Instant Hand Sanitizing wipes recently launched their Sani-Hands Bedside Pack to help healthcare staff communicate critical opportunities for patients to practice hand hygiene: after using the bathroom, before eating and drinking, after contact with others, and after coughing and sneezing. The easy-to-understand illustrations are also ideal for non-English speaking patients and are compliant with the US CDC and World Health Organization (WHO) recommendations for hand hygiene."



PDI's Sani-Hands Bedside Pack

"There is a moving trend toward hand-hygiene-monitoring products in a concerted effort to achieve 100% compliance with evidence-based hand-hygiene recommendations, such as those from the CDC and WHO," said Garrett. "These monitoring solutions, however, do not resolve the behavioral aspects of hand-hygiene compliance. It is important to ensure that the hand-hygiene solution utilized in the facility is efficacious, safe, easy to use, accessible, and gentle on the user's skin."

Historically, hand-hygiene products have been alcohol-based, which works great for quick kill of pathogens but has no persistence. Innovative BioDefense, Lake Forest, CA, has a product that does both. Colette Cozean, PhD, President and CEO, described the product. "The Zylast technology is a synergistic combination of ingredients using the antimicrobial benzethonium chloride (BZT), designed to provide both immediate and persistent kill of pathogens. The primary benefits of the Zylast technology include a 15-second broad-spectrum kill, persistence for 6 hours, efficacy against common viruses, and reduction of skin irritation, benefits not available in traditional alcohol sanitizers. The Zylast Antiseptic was shown to be greater than 100 times more effective against the norovirus surrogate than alcohol alone.¹ The Zylast products have been shown to reduce HAIs by 23.1% and illness absenteeism in schools by 41.6%."

One of the reasons often cited for noncompliance of handwashing protocol is skin damage from repeated cleansing. Cozean believes Zylast has the answer. "Alcohol kills by dehydrating the bacteria cell, but it does the same to the skin. In contrast, BZT adds moisture to the hands and reduces skin irritation." Cozean mentioned a test comparing effects of



STERIS CalStat Plus hand sanitizer

different ingredients, noting, "after 100 daily uses for 5 consecutive days, BZT was shown to significantly increase dermal hydration and showed '0' irritation. In addition, the persistence of Zylast gives a level of protection to the user, even if they forget to wash."

Cozean also pointed out the cost advantage of using Zylast. "The powerful antimicrobial requires 5 times less product to be used, per use, than alcohol, which reduces build-up on the hands and drying time. This also reduces costs for facilities, as a cartridge of Zylast will last 5 times longer than other products."

Cozean offered evidence in support of Zylast claims. "In a crossover clinical study, use of the Zylast Antiseptic was demonstrated to reduce HAI by 23.1%. The study was conducted over 3 months, evaluating more than 6,000 patients in 3 separate units at a 250-bed trauma hospital. In a 4-month crossover study at a pair of sister schools in southern California that evaluated 6,000 staff and student data points, the Zylast Antiseptic Lotion and Foaming Soap reduced illness absenteeism by 41.6% among students and 24.7% among teachers and staff."

Charlie Kilfoyle, Senior Product Manager, STERIS Corporation, Mentor, OH, noted that STERIS hand-hygiene products are different from some competitors' in that they were formulated specifically for healthcare use. "This is a key distinction," stated Kilfoyle, "because HCWs' skin requires specific care to manage the potential effects of frequent washing and glove use."

For example, the sanitizers are designed to rub in quickly and leave minimal build-up, making it easy to don gloves. The soaps are designed to be free-rinsing, to leave hands feeling clean. In addition, most STERIS sanitizers and one hand lotion are documented to sustain the effects of chlorhexidine gluconate."

Kilfoyle talked further about STERIS's approach to hand hygiene and skin care. "STERIS's formulation strategy is based



Zylast products provide both immediate and persistent kill of pathogens.

on mildness and efficacy. STERIS products are formulated specifically for users who may wash or sanitize more than 100 times per day. Our soaps are very mild; some are milder than water. In the alcohol-sanitizer category, STERIS formulas demonstrate increased moisturization, some for up to 2 hours after use, and some are designed to moisturize better than lotion."

"The products are also extremely efficacious. Many meet the Food and Drug Administration's proposed Healthcare Personnel Handwash criteria; have 99.999% or greater efficacy, which is 100 times greater reduction than a product with just 99.9% claims; and show excellent broad-spectrum activity against both gram-positive and gram-negative organisms. The ability to use our formulations frequently and the security of knowing they are effective, when used as directed, are important benefits that STERIS delivers to healthcare professionals." Kilfoyle emphasized, "In an environment where hand-hygiene-monitoring systems will become the standard of care, it is even more important that hand-hygiene products, both soap and sanitizer, can support 100% compliance."

Hand-drying products

Hand towels may not be the first product we think of in the battle to improve hand hygiene, but, according to Stéphane Rousseau, Executive Vice President, Away-from-Home Products, North America, Cascades Tissue Group, Marie-Victorin, QC, Canada, they are an important weapon. Rousseau outlined why their product is different. "Unlike ordinary paper towels, when the Cascades Antibacterial paper towel comes into contact with the water on your hands as you dry them, it releases an active ingredient, benzalkonium chloride, that kills over 99.99% of harmful bacteria." An important advantage, Rousseau explained, is that the antibacterial effect lasts for 2 hours. An added attraction is that the towels are made from 100% recycled fiber.

Rousseau also addressed the issue of skin damage due to frequent hand washing in the context of their product. "Repeated use of Cascades Antibacterial paper towel does not cause skin sensitivity problems," said Rousseau. "We conducted clinical tests on humans, in an independent laboratory, that have shown the product is non-allergic and non-irritant. In fact, benzalkonium chloride is known as a skin softener, and the repetitive use of our product is recommended, to increase its efficacy."



Cascades Antibacterial paper towels kill >99.99% of residual bacteria for 2 hours.

"Proper handwashing and drying with Cascades Antibacterial paper towels helps reduce norovirus incidences, and they are more effective than regular towels at removing bacteria," said Rousseau. "A field study [published in a white paper from Cascades] was recently conducted by Jason A. Tetro, a microbiologist and germ specialist. Based on the results of this trial, the use of Cascades Antibacterial paper towel in the handwashing process resulted in significantly higher ($P=.009$) bacterial reduction than the use of a regular paper towel."

Rousseau also said that Cascades Antibacterial paper towel has garnered 10 awards. "Some of the most distinguished recognitions include the 2013 Edison Award Gold medal, a 4-star Environmental Leader Technology Review Score, the 2011 Stevie Award for Best New Product in the Health Category, and the International Sanitary Supply Association's Innovative Product of the Year in 2010. Cascades also received accolades from the International Conference on Prevention and Infection Control and Pulp & Paper International."

William Gagnon, Vice President of Marketing, Excel Dryer Inc., East Longmeadow, MA, described XLERATOR, a hand-drying alternative to paper towels. Gagnon explained how their product is different from other hand dryers. "Twelve years ago, XLERATOR revolutionized the hand-drying industry with patented technology proven to dry hands 3 times faster, in 10 to 15 seconds, using 80% less energy than conventional hand dryers. XLERATOR also offers a 95% cost savings versus paper towels."

Gagnon talked about XLERATOR's most recent advances. "This year, XLERATOR integrated the first-ever certified high-efficiency particulate air (HEPA) filtration system for hand dryers. XLERATOR HEPA filters improve the quality of the air by removing 99.97% of bacteria and particulates in the room that are 0.3 μm or larger, by delivering clean, filtered, purified air. This year also marked the addition of an optional speed- and sound-control component, to further enhance customer satisfaction, as well as several optional accessories."

Optional accessories include "digital-imaging technology for custom cover designs, adopted by organizations such as the New England Patriots, Starbucks, Coca Cola, and many healthcare facilities; newly designed XChanger paper-towel dispenser retrofit



Excel Dryer's XLERATOR with certified HEPA filtration system

kits, enabling a complete transformation from paper towels to XLERATOR-equipped restrooms, without major renovation needed; and an antimicrobial wall guard."

Gagnon cited a published scientific study in support of XLERATOR's efficacy. "Gustafson and colleagues² at the Mayo Clinic in Rochester, MN, conducted a randomized trial to determine

the effects of four hand-drying methods for removing bacteria from washed hands. In a year-long study of 100 people who volunteered to have their hands contaminated with bacteria, researchers found that hand washing got rid of the same amount of germs regardless of drying style."

Compliance-monitoring systems

Despite the plethora of evidence on the importance of hand hygiene, monitoring still seems to be necessary to ensure hand-hygiene compliance. Administrative support and accountability are important components of successful hand-hygiene-compliance campaigns, noted Garrett, PDI. "These types of critical initiatives must have a C-suite sponsor who is charged with staff accountability. It also is vital to ensure that transparency with compliance is ongoing, especially regarding the publication of facility data. It is only through routine analysis of data that facilities can continually improve outcomes, including compliance with the lifesaving practice of hand hygiene. With executive championship and data transparency, compliance has the best chance for success."

Garrett explained how compliance can be accomplished successfully. "Adult behavior is adjusted through reinforcement. Using seatbelts as an example, wearing a seatbelt is now hard-wired behavior throughout society. Part of this was accomplished using built-in alarm systems that warn the user they are not being compliant and then continually alarm until the behavior is correctly modified. This is seen in healthcare equipment, such as intravenous-therapy pumps or telemetry monitors commonly, and is now being seen in hand-hygiene-monitoring practices."

HyGreen Inc., Gainesville, FL, has a hand-hygiene-compliance product, based on reinforcement, that they believe overcomes the disadvantages of direct observation, which is still the gold standard for hand-wash monitoring. Elena Fraser, Vice President of Client Services, stated, "That method is fraught with bias and inaccuracy. Sample sizes are small, some handwash sinks are in areas that can't be seen by observers, there is a lack of standardization, and, of course,

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when an observer is around, people wash more frequently and then go back to their old habits when the observer is gone."

Heather McLarney, Vice President, Marketing, DebMed, Charlotte, NC, agreed and added, "It is not only costly and time-consuming to conduct direct surveillance but the observation itself is likely to change behavior, as people behave differently when they know they are being watched. This is known as the Hawthorne effect, which artificially inflates hand-hygiene rates because clinicians clean their hands more frequently than they normally would because they know they are being observed.

Electronic monitoring offers a more accurate, cost-effective, and reliable way to measure HCWs' hand-hygiene compliance than direct observation, ultimately improving compliance through real-time feedback, to decrease infections, improve patient safety, and reduce hospital costs."

Fraser described how their monitoring system works. "As the HCW applies soap or gel to their hands, the LED on top of the sensor turns green, and the badge turns green. As the HCW steps into the zone created by the bed monitor over the patient bed, the bed monitor recognizes that the badge is green. All information is transmitted to the database, along with confirmation that you washed your hands before patient contact. The bed monitor also recognizes if the badge is not green and will cause the badge to vibrate. The HCW gets two sets of reminder vibrations, which gives them an opportunity to perform hand hygiene. If they ignore the reminder vibrations and get a third buzz, a noncompliant handwash is logged. This reminder feature is key to effecting change in hand-hygiene behavior. Since you definitively know who is not washing, you can coach those people on hand-hygiene protocols."

Fraser highlighted the experience recorded in a study from a South Florida hospital. "They wanted to determine the effect of HyGreen on hand-hygiene adherence and on the occurrence of HAIs. During the first 6 months of use, [they] found a 94% hand-hygiene-compliance rate and registered more than

HyGreen collects data while monitoring hand-hygiene compliance.



23,000 hand-hygiene events. More significantly, this facility showed an 89% decrease in infections, with HyGreen being the only change in practice.³ This facility also evaluated the costs of HAIs on one of their high-acuity units and presented a study on their findings at the 2012 Association for Professionals in Infection Control and Epidemiology meeting.⁴ The CDC reports that the average cost of an HAI is \$23,000. Because this was a high-acuity unit, the facility thought their costs for infections were much higher. They found each infection averaged \$126,034. On this unit, for just a 6-month period, using HyGreen equated to a savings of \$1,008,272."

GE AgileTrac Hand Hygiene, from GE Healthcare, Wauwatosa, WI, also captures



DebMed GMS captures 100% of hand-hygiene events from soap and sanitizer dispensers.

whether clinicians cleanse their hands each time they enter a room. Ted Dunham, General Manager, US Service Sales, described how their system works. "Radio-frequency identification (RFID) tags are placed on each employee's badge, and each soap and hand-sanitizer

dispenser is equipped with an RFID reading device that activates when someone pulls the lever to wash his or her hands. The system also

uses in-room sensors that detect when an employee enters and exits the room, giving each person 30 seconds to use the soap dispenser or hand sanitizer to be marked as compliant."

"Hand-hygiene-compliance data is tracked in real time and displayed on computer dashboards for managers to refer to and share with clinicians," said Dunham. Again, accountability is highlighted as an important aspect in raising hand-hygiene compliance. "Having data on specific individuals and departments enables hospital leaders to recognize and correct problems as they occur in real-time and to use that data as a basis for targeted

hand-hygiene coaching. Also, having that data provides a starting point for conversation about hand hygiene and infection control, which can give way to process improvements. For example, a conversation with clinicians in a department with high hand-hygiene compliance may provide other departments tips they can use to increase their compliance rates."

Dunham related the experience of Summerville Medical Center, an HCA acute-care hospital in South

Carolina, which recently installed AgileTrac and has seen major hand-hygiene-compliance improvements. "With the technology, Summerville tracks 1.8 million hand washes per year, up from the 700 it tracked manually before. Also, hand-hygiene compliance has increased by 25% across departments," said Dunham.

McLarney talked about the advantages of their hand-hygiene-compliance solution. "The DebMed GMS (group monitoring system) is the world's first electronic hand-hygiene-monitoring system based on the WHO Five Moments," explained McLarney. "The system captures 100% of the hand-hygiene events, from both soap and sanitizer dispensers, at the unit level. The actual number of dispenser events is compared to the expected number of events, calculated based on a proprietary algorithm derived from published, scientific, hand-hygiene benchmark data, as well as dynamic, unit-specific data feeds. It is the only system able to monitor compliance at the critical point-of-care with specialized away-from-wall dispensers."

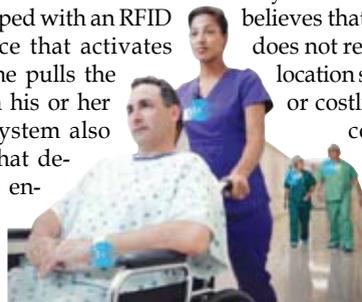
McLarney believes that "because the DebMed GMS does not require an expensive real-time location system or RFID infrastructure or costly staff badges, it is the most cost-effective system on the market."

McLarney conveyed experiences of just a few facilities that have used DebMed GMS with excellent results.

- Results from 2 pilot units in a 500+ bed hospital near Chicago demonstrated an increase in hand-hygiene-compliance rates of 23% and 32% in just 6 months.
- A 150-bed hospital in Massachusetts experienced improvement in hand-hygiene-compliance rates in all 8 units, up to 11% over 6 months' time.
- A 5-hospital health system in South Carolina experienced a 22% reduction in its rate of multidrug-resistant organisms (MDROs) per 1,000 patient-days and a 35% reduction in MDRO clusters per 100 unit months.

Cutting cross-transmission from fomites

Anything that hands touch can contribute to cross-infection. With the advent of technological communication in the healthcare setting came a need to make hand-held fomites more secure against transmission of pathogens. Seal Shield, LLC, Jacksonville, FL, has an interesting solution. CEO and Chairman Bradley Whitchurch explained how SEAL SHIELDS came to be. "Our healthcare cus-



AgileTrac Hand Hygiene, GE's hand-hygiene-compliance tracking system

tomers are using more touch-screen devices, and they are demanding solutions that not only protect those products from scratches but also from harmful bacteria and viruses. SEAL SHIELDS have been developed for the healthcare market to help reduce the spread of infections. SEAL SHIELDS allow practitioners to wash and disinfect their touch-screen devices, protecting HCWs and their patients from infection."

Whitchurch described the product. "SEAL SHIELDS are form-fitting covers that make an iPhone or iPad 100% waterproof, allowing them to be completely disinfected to meet hospital standards. As an added safeguard, it includes antimicrobial protection."

For any doubters, Whitchurch offered some scientific statistics to mull over. "Studies have shown that the average mobile phone is covered with bacteria and that their warm batteries make the perfect breeding ground for pathogens and viruses. Nearly anything the hand becomes contaminated with can transfer onto the phone and vice versa. A 2009 study set out to determine the

contamination rate of HCWs' mobile phones and hands in the operating room and intensive care unit.⁵ It showed a contamination rate of 94.5% and demonstrated that microorganisms isolated from hands and phones were similar. A 2012 study concluded that hospital staff members pick up pathogens from mobile phones after thoroughly washing their hands and showed a contamination rate of 93.7%.⁶ Both studies stated that routine disinfection and antimicrobial additive materials can be effective in reducing the risk of cross-contamination. Hospitals now have a cost-effective solution to mitigate infection risks when it comes to mobile devices and hand hygiene."

Conclusion

Many are the hand-hygiene solutions available to assist in the war against HAIs. Garrett, PDI, neatly summed up the importance



SEAL SHIELDS allow washing and disinfecting of touch-screen devices.

of keeping hands clean and for adhering to hand-hygiene protocols consistently. "Hand hygiene remains the single most important, as well as most economical, infection-prevention intervention." HPN

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